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PRESENTED

# SPONGES

BY

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## DEFINITION OF THE INDIAN OCEAN AREA

FOR the purposes of this report the Indian Ocean is arbitrarily delimited as follows. The Tropic of Capricorn is accepted as the southern boundary. To the east, the boundary starts at the junction of this Tropic with the coast of Africa, thence runs north to include the African coast, Red Sea (excluding the Suez Canal), Persian Gulf and the southern seaboard of Asia to the southern tip of the Malay Peninsula. Sumatra is also included and from the tip of Malaya southwards the western boundary follows the line of latitude 105° west to its junction with the Tropic of Capricorn.

Such an area does not represent a true zoogeographical area, and its use must be qualified by the knowledge that some species, typical of the Indian Ocean proper, may be found further south or east, along the coast of South Africa, in the Southern Ocean and east into the East Indian Archipelago. In addition, species proper to these adjoining areas will in some cases overlap with the Indian Ocean Area as here defined.

## LIST OF SPECIES RECORDED FROM THE INDIAN OCEAN AREA, INCLUDING THOSE NEW WITH THIS REPORT

### Order HEXACTINELLIDA.

(The list of species in this order is arranged according to the scheme given in Ijima, 1927, pp. 364-377.)

#### Sub-order AMPHIDISCOPHORA.

##### Family PHERONEMATIDÆ.

##### Genus *Pheronema* Leidy.

- P. raphanus* Schulze.
- P. carpenteri* (Thomson).
- P. giganteum* Schulze.

##### Genus *Semperella* Gray.

- S. cucumis* Schulze.

##### Genus *Platylistrum* Schulze.

- P. platessa* Schulze.

##### Family MONORHAPHIDÆ.

##### Genus *Monorhaphis* Schulze.

- M. chuni* Schulze.
- M. dives* Schulze.

## Family HYALONEMATIDÆ.

Genus *Hyalonema* Gray.

- H. proximum* Schulze.  
*H. aculeatum* Schulze.  
*H. heideri* Schulze.  
*H. lamella* Schulze.  
*H. indicum* Schulze.  
*H. indicum laccadivense* Schulze.  
*H. indicum andamense* Schulze.  
*H. heymousi* Schulze.  
\**H. affine* Brandt.  
*H. pirum* Schulze.  
*H. tulipa* Schulze.  
*H. nicobaricum* Schulze.  
*H. nicobaricum nicobaricum* Schulze.  
*H. nicobaricum somalicum* Schulze.  
*H. molle* Schulze.  
*H. coniforme* Schulze.  
*H. simile* Schulze.  
*H. valdiviæ* Schulze.  
*H. rapa* Schulze.  
*H. globiferum* Schulze.  
*H. martabanense* Schulze.  
*H. alcocki* Schulze.  
*H. investigatoris* Schulze.  
*H. urna* Schulze.  
*H. solutum* Schulze.  
*H. validum* Schulze.  
*H. masoni* Schulze.  
*H. weltneri* Schulze.

Genus *Compsocalyx* Schulze.

- C. gibberosa* Schulze.

Genus *Lophophysema* Schulze.

- L. inflatum* Schulze.

## Sub-order HEXASTEROPHORA.

## Tribe HEXACTINOSA.

## Sub-tribe CLAVULARIA.

\*This is called *H. apertum* by Ijima (1927) who, throughout a long discourse on the species does not mention *H. affine* Brandt, nor do Brandt's works figure in Ijima's list of literature referred to.

## Family FARREIDÆ.

Genus *Farrea* Bowerbank.*F. occa occa* Bowerbank.*F. occa erecta* Ijima.*F. spirifera* Ijima.Genus *Sarostegia* Topsent.*S. oculata* Topsent.

## Sub-tribe SCOPULARIA.

## Family EURETIDÆ.

Genus *Pleurochorium* Schrammen.*P. annandalei* (Kirkpatrick).Genus *Myliusia* Gray.*M. verrucosa* Ijima.

## Family AULOCALYCIDÆ Ijima.

Genus *Aulocalyx* Schulze.*A. serialis* Dendy.Genus *Rhabdodictyum* Schmidt.*R. delicatum* Schmidt.

## Family APHROCALLISTIDÆ Gray.

Genus *Aphrocallistes* Gray.*A. beatrix* Gray.*(A. bocagei* Wright and *A. ramosus* Schulze are treated as synonyms of *A. beatrix* in this present report.)

## Tribe LYCHNISCOSA.

## Family AULOCYSTIDÆ.

Genus *Aulocystis* Schulze.*A. zitteli zitteli* Marshall and Meyer.*A. grayi grayi* (Bowerbank).*A. grayi polæ* (Ijima).

## Tribe LYSSACINOSA.

## Family LEUCOPSACASIDÆ.

Genus *Placoplegma* Schulze.*P. solutum* Schulze.Genus *Chaunangium* Schulze.*C. crater* Schulze.

## Family EUPLECTELLIDÆ.

Genus *Euplectella* Owen.*E. aspergillum* Owen.*E. regalis* Schulze.*E. simplex* Schulze.? *E. aspera* Schulze.? *E. cucumer* Owen.? *E. suberea* Thomson.Genus *Holascus* Schulze.*H. fibulatus* Schulze.*H. robustus* Schulze.*H. tener* Schulze.Genus *Regadrella* Schmidt.*R. decora* Schulze.*R. phœnix* Schmidt.Genus *Dictyaulus* Schulze.*D. elegans* Schulze.Genus *Saccocalyx* Schulze.*S. pedunculata* Schulze.

## Family CAULOPHACIDÆ.

Genus *Sympagella* Schmidt.*S. johnstoni* (Schulze).

## Family ROSSELLIDÆ.

Genus *Lophocalyx* Schulze.*L. spinosa* Schulze.Genus *Bathydorus* Schulze.*B. lævis* Schulze.

## Order CALCAREA

(The list of species in this order is arranged according to the scheme given by Dendy and Row, 1913.)

## Family HOMOCÆLIDÆ.

Genus *Leucosolenia* Bowerbank.*L. canariensis* (Michlucho-Maclay).*L. coriacea* (Montagu).*L. darwinii* Haeckel.*L. gardineri* Dendy.*L. irregularis* Jenkin.*L. tenuipilosa* Dendy.

Genus *Dendya* Bidder.

*D. prolifera* Dendy.

Family LEUCASCIDÆ.

Genus *Leucetta* Haeckel.

*L. chagosensis* Dendy.

*L. primigenia* Haeckel.

*L. pyriformis* Dendy.

Genus *Pericharax* Poléjaeff.

*P. heteroraphis* (Poléjaeff).

Family LEUCALTIDÆ.

Genus *Leucaltis* Haeckel.

*L. clathria* Haeckel.

Family MINCHINELLIDÆ.

Genus *Plectroninia* Hinde.

*P. deansii* Kirkpatrick.

Family MURRAYONIDÆ.

Genus *Murrayona* Kirkpatrick.

*M. phanolepis* Kirkpatrick.

Family SYCETTIDÆ Dendy.

Genus *Sycetta* Haeckel.

*S. sagittifera* Haeckel.

Genus *Sycon* Risso.

*S. proboscideum* (Haeckel).

*S. raphanus* Schmidt.

*S. tabulatum* (Schuffner).

*S. munitum* Jenkin.

Family HETEROPIIDÆ.

Genus *Grantessa* Lendenfeld.

*G. glabra* Row.

*G. hastifera* (Row).

*G. simplex* Jenkin.

*G. stauridia* (Haeckel).

*G. sycilloides* (Schuffner).

Genus *Heteropia* Carter.

*H. glomerosa* (Bowerbank).

Genus *Grantilla* Row.*G. quadriradiata* Row.

## Family GRANTIIDÆ.

Genus *Grantia* Fleming.*G. indica* Dendy.Genus *Leuconia* Grant.*L. anguinea* (Ridley).*L. bathybia* (Haeckel).*L. claviformis* (Schuffner).*L. donnani* (Dendy).*L. echinata* (Schuffner).*L. falcigera* (Schuffner).*L. infesta* Row.*L. innominata* Row.*L. pulvinar* (Haeckel).*L. wasinensis* (Jenkin).Genus *Aphroceras* Gray.*A. alcicornis* Gray.Genus *Paraleucilla* Dendy.*P. cucumis* (Haeckel).

## Family AMPHORISCIDÆ.

Genus *Leucilla* Haeckel.*L. proteus* Dendy.

## Family LELAPIIDÆ.

Genus *Kebira* Row.*K. uteoides* Row.

## Order TETRAXONIDA.

## Sub-order HOMOSCLEROPHORA.

## Family PLAKINIDÆ.

Genus *Acanthoplakina* gen. n.*A. spinosa* (Kirkpatrick).Genus *Astroplakina* Dendy and Burton.*A. stelligera* Dendy and Burton.

Genus *Dercitopsis* Dendy.

- D. ceylonica* Dendy.  
*D. clathrata* (Kirkpatrick).

Genus *Plakortis* Schulze.

- P. simplex* Schulze.

Genus *Thrombus* Sollas.

- T. ornatus* Schulze.

## Sub-order STREPTASTROSCLEROPHORA.

## Family PACHASTRELLIDÆ.

Genus *Yodomia* Lebwahl.

- Y. perfecta* Dendy.

Genus *Pachastrella* Schmidt.

- P. monilifera* Schmidt.

Genus *Pæcillastra* Sollas.

- P. eccentrica* Dendy and Burton.  
*P. schulzei* (Sollas).

Genus *Sphinctrella* Schmidt.

- S. annulata* (Carter).  
*S. gracilis* (Sollas).  
*S. theneides* sp. n.

## Family THENEIDÆ.

Genus *Thenea* Gray.

- T. muricata* (Bowerbank).  
*T. grayi* Sollas.  
*T. wyvillii* Sollas.  
*T. centrotyla* Lendenfeld.

## Sub-order ASTROSCLEROPHORA.

## Family STELLETTIDÆ.

Genus *Stelletta* Schmidt.

- S. purpurea* Ridley.  
*S. herdmani* Dendy.  
*S. mauritiana* (Dendy).

Genus *Ecionemia* Bowerbank.

- E. acervus* Bowerbank.

Genus *Penares* Gray.

- P. intermedia* (Dendy).

## Family GEODIIDÆ.

Genus *Geodia* Lamarck.*G. perarmata* Bowerbank.*G. globostellifera* Carter.*G. areolata* Carter.*G. sphaeroides* (Kieschnick).Genus *Pachymatisma* Bowerbank.*P. bifida* sp. n.Genus *Erylus* Gray.*E. lendenfeldi* Sollas.

## Family CHONDROSIIDÆ.

Genus *Chondrilla* Schmidt.*C. australiensis* Carter.Genus *Chondrosia* Nardo.*C. reniformis* Nardo.

## Family TETILLIDÆ.

Genus *Tetilla* Schmidt.*T. cranium* (Müller).*T. oxeata* sp. n.Genus *Chrotella* Sollas.*C. cavernosa* (Lamarck).*C. eurystoma* (Keller).Genus *Paratetilla* Dendy.*P. bacca* (Selenka).Genus *Fangophilina* Schmidt.*F. submersa* Schmidt.Genus *Acanthotetilla* gen. n.*A. hemisphaerica* sp. n.

## Family CLAVULIDÆ.

Genus *Suberites* Nardo.*S. domuncula* (Olivi).*S. ramulosus* Ridley and Dendy.*S. kelleri* Burton.Genus *Pseudosuberites* Topsent.*P. hyalinus* (Ridley and Dendy).



Genus *Laxosuberites* Topsent.

*L. longispiculus* sp. n.

Genus *Tentorium* Vosmaer.

*T. semisuberites* (Schmidt).

Genus *Tentorina* gen. n.

*T. sigmatophora* sp. n.

Genus *Polymastia* Bowerbank.

*P. tubulifera* Dendy.

*P. murrayi* sp. n.

*P. clavata* sp. n.

Genus *Radiella* Schmidt.

*R. sarsii* (Ridley and Dendy).

Genus *Spirastrella* Schmidt.

*S. cuspidifera* (Lamarck).

*S. spinispirulifer* (Carter).

Genus *Diplastrella* Topsent.

*D. gardineri* Topsent.

Genus *Timea* Gray.

*T. capitatostellifera* (Carter).

*T. tethyoides* sp. n.

*T. sphaerastrea* sp. n.

Genus *Trachycladus* Carter.

*T. tethyoides* sp. n.

*T. cervicornis* sp. n.

Genus *Placospongia* Gray.

*P. carinata* (Bowerbank).

Family ASTRAXINELLIDÆ.

Genus *Hemiasterella* Carter.

*H. typus* Carter.

*H. complicata* Topsent.

Family TETHYADÆ.

Genus *Tethya* Lamarck.

*T. repens* Schmidt.

## Sub-order LITHISTIDA.

(Since the sub-order is here regarded as a polyphyletic and artificial group, see Burton, 1929, pp. 1-12, no attempt is made to apportion the species to families.)

Genus *Discodermia* Bocage.

*D. natalensis* Kirkpatrick.

*D. emarginata* Dendy.

Genus *Theonella* Gray.

*T. lacerata* Lendenfeld.

*T. discifera* Lendenfeld.

*T. pulchrifolia* Dendy.

Genus *Corallistes* Schmidt.

*C. bowerbanki* (Johnson).

Genus *Taprobane* Dendy.

*T. herdmani* Dendy.

Genus *Microscleroderma* Kirkpatrick.

*M. hirsutum* (Kirkpatrick).

## Sub-order SIGMATOSCLEROPHORA.

## Family HAPLOSCLERIDÆ.

Genus *Haliclona* Grant.

*H. camerata* (Ridley).

*H. cribriformis* (Ridley).

*H. flagellifer* (Ridley and Dendy).

*H. cf. ochracea* (Keller).

*H. contignata* (Thiele).

*H. irregularis* (Kirkpatrick).

*H. expansa* (Thiele).

*H. obtusispiculifera* (Dendy).

*H. decidua* (Topsent).

*H. tabernacula* (Row).

*H. seychellensis* (Dendy).

*H. tuberosa* (Dendy).

*H. cerebrum* (Burton).

*H. carteri* sp. n.

Genus *Adocia* Gray.

*A. sagittarius* (Sollas).

*A. fibulatus* (Schmidt), var. *microsigma* (Dendy).

*A. pigmentifera* (Dendy).

*A. digitata* (Baer).

*A. cf. semifibrosa* (Dendy).

*A. tufoides* (Dendy).

Genus *Petrosia* Vosmaer.

- P. testudinaria* (Lamarck).  
*P. mauritiana* (Carter).  
*P. nigricans* Lindgren.

Genus *Oceanapia* Gray.

- O. putridosum* (Lamarck).  
*O. fistulosa* (Bowerbank).  
*O. canalis* (Ridley).  
*O. elastica* (Keller).  
*O. media* (Thiele).  
*O. zoologica* (Dendy).  
*O. incrustata* (Dendy).  
*O. cf. cagayense* (Wilson).

Genus *Callyspongia* Duchassaing and Michelotti.

- C. diffusa* (Ridley).  
*C. subarmigera* (Ridley).  
*C. confœderata* (Ridley).  
*C. fibrosa* (Ridley and Dendy).  
*C. spinosissima* (Dendy).  
*C. clathrata* (Dendy).  
*C. barodensis* **sp. n.**  
*C. rowi* **sp. n.**

Genus *Gelliodes* Ridley.

- G. fibulatus* Ridley.

## Family DESMACIDONIDÆ.

## Sub-family MYCALINÆ.

Genus *Biemna* Gray.

- B. fortis* (Topsent).  
*B. trirhaphis* (Topsent).  
*B. ciocalytoides* **sp. n.**

Genus *Desmacella* Schmidt.

- D. annexa* Schmidt.

Genus *Mycale* Gray.

- M. sulevoidea* (Sollas).  
*M. murrayi* (Ridley and Dendy).  
*M. sulcata* (Hentschel).  
*M. massa* (Schmidt), var *oceanica* Topsent  
*M. topsenti* **sp. n.**

Genus *Hamacantha* Gray.

*H. mindanaensis* Wilson.

*H. simplex* sp. n.

Genus *Guitarra* Carter.

*G. fimbriata* Carter.

Sub-family MYXILLINÆ.

Genus *Myxilla* Schmidt.

*M. simplex* (Baer).

*M. dendyi* sp. n.

Genus *Lissodendoryx* Topsent.

*L. ciocalyptoides* sp. n.

*L. damirioides* sp. n.

*L. tubicola* sp. n.

Genus *Ectyodoryx* Lundbeck.

*E. raphidiophora* sp. n.

*E. coralliophila* sp. n.

Genus *Hymedesmia* Bowerbank.

*H. murrayi* sp. n.

Genus *Phorbas* Duchassaing and Michelotti.

*P. styliferus* sp. n.

Genus *Desmapsamma* Burton.

*D. anchorata* (Carter).

Genus *Iotrochota* Ridley.

*I. baculifera* Ridley.

Genus *Acanthancora* Topsent.

*A. stylifera* sp. n.

Genus *Damirina* gen. n.

*D. verticillata* sp. n.

Genus *Tedania* Gray.

*T. nigrescens* (Schmidt).

Genus *Strongylacidon* Lendenfeld.

*S. inaequalis* (Hentschel).

Genus *Lithoplocamia* Dendy.

*L. lithistoides* Dendy.

Genus *Agelas* Duchassaing and Michelotti.

*A. mauritanus* (Carter).

## Sub-family CLATHRIINÆ.

Genus *Clathria* Schmidt.

- C. frondifera* (Bowerbank).  
*C. aculeata* Ridley.  
*C. procera* (Ridley).  
*C. maeandrina* Ridley.  
*C. mixta* Hentschel.  
*C. spicata* Hallmann.  
*C. transiens* Hallmann.  
*C. whiteleggii* Dendy.  
*C. spongiosa* **sp. n.**

Genus *Ophlitaspongia* Bowerbank.

- O. minor* **sp. n.**

Genus *Microciona* Bowerbank.

- M. affinis* Carter.  
*M. longitoxa* (Hentschel).  
*M. rhopalophora* (Hentschel).  
*M. densa* **sp. n.**  
*M. longistyla* **sp. n.**  
*M. anonyma* **sp. n.**

Genus *Echinodictyum* Ridley.

- E. nervosum* Ridley.  
*E. jousseaumei* Topsent.

Genus *Antho* Gray.

- A. tawiensis* (Wilson).

Genus *Echinoplocamia* **gen. n.**

- E. arbuscula* **sp. n.**

Genus *Acarnus* Gray.

- A. topsenti* Dendy.

Genus *Plocamilla* Topsent.

- P. manaarensis* (Carter).

## Sub-family RASPELIINÆ.

Genus *Aulospongius* Norman.

- A. tubulatus* (Bowerbank).

Genus *Rhabderemia* Topsent.

- R. indica* Dendy.

Genus *Endectyon* Topsent.

- E. thurstoni* (Dendy).

Genus *Hemectyonilla* **gen. n.***H. involutum* (Kirkpatrick).Genus *Higginsia* Higgin.*H. petrosioides* Dendy.*H. robusta* **sp. n.**Genus *Raspailopsis* **gen. n.***R. cervicornis* **sp. n.**

## Family AXINELLIDÆ.

Genus *Amorphinopsis* Carter.*A. megalorhaphis* (Carter).Genus *Axinella* Schmidt.*A. carteri* (Dendy).*A. lamellata* (Dendy).*A. agariciformis* (Dendy).*A. durissima* (Dendy).*A. conulosa* (Dendy).*A. bidderi* **sp. n.***A. ventilabrum* **sp. n.***A. flabello-reticulata* **sp. n.***A. dragmaxioides* **sp. n.***A. massalis* **sp. n.**Genus *Phakellia* Bowerbank.*P. radiata* (Dendy).Genus *Hymeniacidon* Bowerbank.*H. virgultosa* (Carter).*H. variospiculata* Dendy.Genus *Ciocalypta* Bowerbank.*C. penicillus* Bowerbank.Genus *Collocalypta* Dendy.*C. digitata* Dendy.Genus *Sigmaxinella* Dendy.*S. megastyla* **sp. n.**Genus *Stylissa* Hallmann.*S. massa* (Carter).*S. coccinea* (Keller).Genus *Ptilocaulis* Carter.*P. spiculifera* (Lamarck).

Genus *Raspaigella* Schmidt.

*R. salomonensis* (Dendy).

*R. dendyi* sp. n.

*R. ? suluensis* (Wilson).

Genus *Pseudaxinyssa* Burton.

*P. tenuispiculata* Burton.

Order KERATOSA.

Genus *Darwinella* Müller.

*D. simplex* Topsent.

Genus *Aplysina* Nardo.

*A. euplectella* (Hentschel).

*A. mollis* Row.

*A. primitiva* sp. n.

Genus *Aplysinopsis* Lendenfeld.

*A. reticulata* Hentschel.

Genus *Druinella* Lendenfeld.

*D. ramosa* Thiele.

Genus *Megalopastas* Dendy.

*M. retiaria* Dendy.

Genus *Spongia* Linnaeus.

*S. officinalis* Linnaeus.

Genus *Spongionella* Bowerbank.

*S. pulvilla* (Dendy).

*S. nigra* Dendy.

*S. frondosa* (Hentschel).

Genus *Psammaplysilla* Keller.

*P. arabica* Keller.

Genus *Cacospongia* Schmidt.

*C. herdmani* (Dendy).

*C. symbiotica* sp. n.

Genus *Dysidea* Johnston.

*D. fragilis* (Montagu).

*D. cinerea* Keller.

Genus *Euryspongia* Row.

*E. lactea* Row.

Genus *Hircinia* Nardo.*H. arenosa* Lendenfeld.*H. aruensis* Hentschel.Genus *Carteriospongia* Hyatt.*C. cordifolia* Keller.LIST OF SPECIES OBTAINED BY THE  
JOHN MURRAY EXPEDITION, IN SYSTEMATIC ORDER, WITH  
NUMBERS OF STATIONS AND DEPTHS.

Name.	Station.	Depth in m.
<i>Pheronema giganteum</i>	122	745
<i>Semperella cucumis</i>	145	494
<i>Monorhaphis dives</i>	119	1204
<i>Monorhaphis</i> sp.	118	1789
<i>Hyalonema affine</i>	176	695
<i>Farrea spirifera</i>	157	229
<i>Farrea occa</i> subsp. <i>erecta</i>	162	1829
<i>Sarostegia oculata</i>	42, 54, 152, 153, 162	1415, 1046, 878, 256, 1829
<i>Pleurochorium annandalei</i>	152	878
<i>Myliusia verrucosa</i>	109	640
<i>Aphrocallistes beatrix</i>	54, 108	1046, 781
<i>Placoplegma solutum</i>	54	1046
<i>Euplectella simplex</i>	145	494
<i>Holascus fibulatus</i>	145	494
<i>Leucosolenia gardineri</i>	43	95
<i>Leucetta pyriformis</i>	148	27
<i>Grantessa zanzibarica</i>	10	55
<i>Grantessa sycilloides</i>	24	73-220
<i>Grantessa glabra</i>	43	95
<i>Sycon munitum</i>	24	73-220
<i>Leuconia wasinensis</i>	45	38
<i>Dercitopsis ceylonica</i>	111	Probably between 73-165
<i>Dercitopsis minor</i>	24, 45	73-220, 38
<i>Yodomia perfecta</i>	157	229
<i>Pachastrella monilifera</i>	112, 152, 153, 157	113, 878, 256, 229
<i>Pæcillastra schulzei</i>	123, 157	256-366, 229
<i>Sphinctrella gracilis</i>	89, 123, 177	193, 256-366, 366
<i>Sphinctrella theneides</i>	152	878
<i>Thenea centrotyla</i>	145	494
<i>Thenea grayi</i>	108	781
<i>Thenea muricata</i>	122	745
<i>Thenea wyvillii</i>	177	366
<i>Stelletta purpurea</i>	53	13.5
<i>Stelletta herdmanni</i>	45, 111, 112	38, unknown, 113
<i>Stelletta mauritiana</i>	45	38
<i>Ecionemia acervus</i>	45, 111, 112	38, unknown, 113
<i>Penares intermedia</i>	111	depth unknown
<i>Geodia perarmata</i>	27, 45, 112	37, 38, 113
<i>Geodia globostellifera</i>	43	95
<i>Geodia areolata</i>	24, 27, 45, 53, 145	73-220, 37, 38, 13.5
<i>Geodia sphaeroides</i>	89, 152	193, 878
<i>Pachymatisma bifida</i>	157	229



Name.	Station.	Depth in m.
<i>Erylus ledenfeldi</i>	111	Depth unknown
<i>Chondrilla australiensis</i>	45	38
<i>Chondrosia reniformis</i>	53	13·5
<i>Tetilla cranium</i>	45, 53	38, 13·5
<i>Tetilla oxeata</i>	43	95
<i>Chrotella cavernosa</i>	27, 43	37, 95
<i>Chrotella eurystoma</i>	24, 45	73-220, 38
<i>Paratetilla bacca</i>	45	38
<i>Fangophilina submersa</i>	106	212
<i>Acanthotetilla hemisphaerica</i>	45	38
<i>Suberites domuncula</i>	175	1618
<i>Suberites ramulosus</i>	43, 54, 157	95, 1046, 229
<i>Suberites kelleri</i>	24	73-220
<i>Pseudosuberites hyalinus</i>	194	220
<i>Laxosuberites longispiculus</i>	157	229
<i>Tentorium semisuberites</i>	108	781
<i>Tentorina sigmatophora</i>	157	229
<i>Polymastia tubulifera</i>	53	13·5
<i>Polymastia murrayi</i>	157, 177, 185	229, 366, 2001
<i>Polymastia clavata</i>	24	73-220
<i>Radiella sarsii</i>	108, 145 E	781-494
<i>Spirastrella cuspidifera</i>	45, 53, 111	38, 13·5, unknown
<i>Spirastrella spinispirulifer</i>	111	73-165
<i>Diplastrella gardineri</i>	111, 117	73-165, 366
<i>Timea capitostellifera</i>	111	73-165
<i>Timea tethyoides</i>	112	113
<i>Timea sphaestræa</i>	111	Depth ?
<i>Trachycladus tethyoides</i>	24	73-220
<i>Trachycladus cervicornis</i>	24	73-220
<i>Placospongia carinata</i>	45	38
<i>Hemiassterella typus</i>	27	37
<i>Hemiassterella complicata</i>	24	73-220
<i>Tethya repens</i>	45, 53, 112, 152	38, 13·5, 113, 878
<i>Discodermia natalensis</i>	111	73-165
<i>Discodermia emarginata</i>	123	256-366
<i>Theonella lacerata</i>	43	95
<i>Theonella discifera</i>	45, 111	38, 73-165
<i>Theonella pulchrifolia</i>	157	229
<i>Corallistes bowerbanki</i>	123	256-366
<i>Taprobane herdmani</i>	27, 45	37, 38
<i>Microscleroderma hirsutum</i>	45	38
<i>Haliclona camerata</i>	10	55
<i>Haliclona cribriformis</i>	53, 111	13·5, 73-165
<i>Haliclona flagellifer</i>	M.B. I (d), 157	26, 229
<i>Haliclona cf. ochracea</i>	9	245
<i>Haliclona contignata</i>	10, 24, 111	55, 73-220 (? 73-165)
<i>Haliclona irregularis</i>	24, 111, 157	73-220, 73-165, 229
<i>Haliclona expansa</i>	157	229
<i>Haliclona obtusispiculifera</i>	D	23
<i>Haliclona decidua</i>	110	73-165
<i>Haliclona tabernacula</i>	45	38
<i>Haliclona seychellensis</i>	45, 112	38, 113
<i>Haliclona tuberosa</i>	45	38
<i>Haliclona cerebrum</i>	111	73-165
<i>Haliclona carteri</i>	27, 45	37, 38
<i>Adocia sagittarius</i>	139	57

Name.	Station.	Depth in m.
<i>Adocia fibulatus</i> var. <i>microsigma</i>	141	44
<i>Adocia pigmentifera</i>	10	55
<i>Adocia digitata</i>	111	73-165
<i>Adocia</i> cf. <i>semifibrosa</i>	27	37
<i>Adocia tufoides</i>	157	229
<i>Petrosia testudinaria</i>	10, 111	55, 73-165
<i>Petrosia mauritiana</i>	111	73-165
<i>Petrosia nigricans</i>	9, 10, 111, 157	245, 55, (? 73-165) 229
<i>Oceanapia putridosum</i>	144	31
<i>Oceanapia fistulosa</i>	45	38
<i>Oceanapia canalis</i>	45	38
<i>Oceanapia elastica</i>	139	57
<i>Oceanapia media</i>	111	73-165
<i>Oceanapia zoologica</i>	111, 112	Unknown, 113
<i>Oceanapia incrustata</i>	11	207
<i>Oceanapia</i> cf. <i>cagayense</i>	112	113
<i>Callyspongia diffusa</i>	24, 111	73-220, unknown
<i>Callyspongia subarmigera</i>	M.B. I (d), 45, 111, M.B. (b)	26, 38, 73-165, 29
<i>Callyspongia confederata</i>	45, 53	38, 13·5
<i>Callyspongia fibrosa</i>	27, 45, 53	37, 38, 13·5
<i>Callyspongia spinosissima</i>	24, 45, 50, 53	73-220, 38, 1939, 13·5
<i>Callyspongia clathrata</i>	A	65
<i>Callyspongia barodensis</i>	45	38
<i>Callyspongia rowi</i>	45	38
<i>Gelliodes fibulatus</i>	27	37
<i>Biemna fortis</i>	24, 27	73-220, 37
<i>Biemna trirhaphis</i>	10	55
<i>Biemna ciocalyptoides</i>	27	37
<i>Desmacella annexa</i>	122	732
<i>Mycale sulevoidea</i>	M.B. I (d)	26
<i>Mycale murrayi</i>	24	73-220
<i>Mycale sulcata</i>	24, 53, 112	73-220, 13·5, 113
<i>Mycale massa</i> var. <i>oceanica</i>	54	1046
<i>Mycale topsenti</i>	54	1046
<i>Hamacantha mindanaensis</i>	152, 157	878, 229
<i>Hamacantha simplex</i>	157	229
<i>Guitarra fimbriata</i>	11, 177	207, 366
<i>Myxilla simplex</i>	24	73-220
<i>Myxilla dendyi</i>	27, 45	37, 38
<i>Lissodendoryx ciocalyptoides</i>	177	366
<i>Lissodendoryx damirioides</i>	54	1046
<i>Lissodendoryx tubicola</i>	54	1046
<i>Ectyodoryx raphidiophora</i>	24	73-220
<i>Ectyodoryx coralliophila</i>	54, 157	1046, 229
<i>Hymedesmia murrayi</i>	111	73-165
<i>Phorbas styliferus</i>	24	73-220
<i>Desmapsamma anchorata</i>	111	73-165
<i>Iotrochota baculifera</i>	10, M.B. I (d)	55, 26
<i>Acanthancora stylifera</i>	45	38
<i>Damirina verticillata</i>	112	113
<i>Tedania nigrescens</i>	9, 10, 27	245, 55, 37
<i>Strongylacidon inaequalis</i>	M.B. I (b)	26
<i>Lithoplocamia lithistoides</i>	9, 45	245, 38
<i>Agelas mauritanus</i>	27	37
<i>Clathria frondifera</i>	M.B. I (d)	26
<i>Clathria aculeata</i>	10, M.B. I (d), 45	55, 29, 38

Name.	Station.	Depth in m.
<i>Clathria procera</i>	M.B. I (d), M.B. I (b)	26, 26
<i>Clathria maeandrina</i>	M.B. I (d)	26
<i>Clathria mixta</i>	53	13·5
<i>Clathria spicata</i>	27	37
<i>Clathria transiens</i>	M.B. I (b)	29
<i>Clathria whiteleggii</i>	24, 27, M.B. II (c)	73-200, 37, 29
<i>Clathria spongiosa</i>	9, 27	245, 38
<i>Ophlitaspongia minor</i>	89	193
<i>Microciona affinis</i>	45, 112	28, 113
<i>Microciona longitoza</i>	24	73-220
<i>Microciona rhopalophora</i>	157	229
<i>Microciona densa</i>	45	38
<i>Microciona longistyla</i>	45	38
<i>Microciona anonyma</i>	111	73-165
<i>Echinodictyum nervosum</i>	53	13·5
<i>Echinodictyum jousseaumei</i>	9	245
<i>Antho tawiensis</i>	43, 89	95, 193
<i>Echinoplocamia arbuscula</i>	177	366
<i>Plocamilla manaarensis</i>	89	193
<i>Acarnus topsenti</i>	45	38
<i>Aulospongia tubulatus</i>	27, 53	37, 13·5
<i>Rhabderemia indica</i>	27, 209	37, 366
<i>Endectyon thurstoni</i>	45	38
<i>Hemectyonilla involutum</i>	27, 24, 45, 185	37, 73-220, 38, 2001
<i>Higginsia petrosioides</i>	45	38
<i>Higginsia robusta</i>	27, 35, 45	37, 441, 38
<i>Raspailopsis cervicornis</i>	27, 45, 53, 111	37, 38, 13·5, 73-165
<i>Amorphinopsis megalorhaphis</i>	43, 45, 53, 111	95, 38, 13·5, 73-165
<i>Axinella carteri</i>	53	13·5
<i>Axinella lamellata</i>	45	38
<i>Axinella agariciformis</i>	45	38
<i>Axinella durissima</i>	M.B. I (G), 27, 45, 112	26, 37, 38, 113
<i>Axinella convulosa</i>	112	113
<i>Axinella bidderi</i>	35, 45, 54	441, 38, 1046
<i>Axinella ventilabrum</i>	112	113
<i>Axinella flabello-reticulata</i>	112	113
<i>Axinella dragmaxioides</i>	45	38
<i>Axinella massalis</i>	112	113
<i>Phakellia radiata</i>	9, 27, 45, 89, 111, 112	245, 37, 38, 193, (? 73-165), 113
<i>Hymeniacidon virgultosa</i>	27, 45	37, 38
<i>Hymeniacidon variospiculata</i>	45	38
<i>Ciocalypa penicillus</i>	161	46
<i>Collocalypa digitata</i>	112	113
<i>Sigmaxinella megastyla</i>	24	73-220
<i>Stylissa massa</i>	53	13·5
<i>Stylissa coccinea</i>	53	13·5
<i>Ptilocaulis spiculifera</i>	151	101
<i>Raspigella salomonensis</i>	112	113
<i>Raspigella ? suluensis</i>	112	113
<i>Raspigella dendyi</i>	45, 112	38, 113
<i>Pseudaxinyssa tenuispiculata</i>	45	38
<i>Darwinella simplex</i>	45	38
<i>Aplysina euplectella</i>	24	73-220
<i>Aplysina mollis</i>	45	38
<i>Aplysina primitiva</i>	111	73-165

Name.	Station.	Depth in m.
<i>Aplysinopsis reticulata</i>	111	Depth unknown
<i>Druinella ramosa</i>	45	38
<i>Megalopastas retiaria</i>	53	13·5
<i>Spongia officinalis</i>	43	95
<i>Spongionella pulvilla</i>	45	38
<i>Spongionella nigra</i>	27, 45	37, 38
<i>Spongionella frondosa</i>	45	38
<i>Psammaplysilla arabica</i>	M.B. I (d)	26
<i>Cacospongia herdmani</i>	45, 53	38, 13·5
<i>Cacospongia symbiotica</i>	45	38
<i>Dysidea fragilis</i>	24, 45, 109	73-220, 38, 640
<i>Dysidea cinerea</i>	112	113
<i>Euryspongia lactea</i>	45	38
<i>Hircinia arenosa</i>	45, 53	38, 13·5
<i>Hircinia aruensis</i>	53	13·5
<i>Carteriospongia cordifolia</i>	45	38

ANALYSIS OF SPECIES OBTAINED BY THE  
JOHN MURRAY EXPEDITION, SHOWING DEPTHS AND SPECIES OBTAINED.

Station.	Depth in m.	Name.
53	13·5	<i>Stelletta purpurea.</i> <i>Geodia areolata.</i> <i>Chondrosia reniformis.</i> <i>Tetilla cranium.</i> <i>Spirastrella cuspidifera.</i> <i>Tethya repens.</i> <i>Haliclona cribriformis.</i> <i>Callyspongia confoederata.</i> <i>Callyspongia fibrosa.</i> <i>Callyspongia spinosissima.</i> <i>Mycale sulcata.</i> <i>Clathria mixta.</i> <i>Echinodictyum nervosum.</i> <i>Aulospongius tubulatus.</i> <i>Raspailopsis cervicornis.</i> <i>Amorphinopsis megalorhaphis.</i> <i>Axinella carteri.</i> <i>Stylissa massa.</i> <i>Stylissa coccinea.</i> <i>Megalopastas retiaria.</i> <i>Cacospongia herdmani.</i> <i>Hircinia arenosa.</i> <i>Hircinia aruensis.</i>
M.B. I (d)	23	<i>Callyspongia subarmigera.</i> <i>Haliclona obtusispiculifera.</i>
M.B. I (d)	26	<i>Haliclona flagellifer.</i> <i>Mycale sulevoidea.</i> <i>Iotrochota baculifera.</i> <i>Clathria aculeata.</i> <i>Clathria procera.</i> <i>Clathria maeandrina.</i> <i>Psammaplysilla arabica.</i>

Station.	Depth in m.	Name.
M.B. I (b)	29	<i>Callyspongia subarmigera</i> . <i>Clathria transiens</i> . <i>Clathria procera</i> . <i>Strongylacidon inaequalis</i> .
M.B. I (c)	26	<i>Axinella durissima</i> .
148	27	<i>Leucetta pyriformis</i> .
M.B. II (c)	29	<i>Clathria whiteleggii</i> .
144	31	<i>Oceanapia putridosum</i> .
27	37	<i>Geodia perarmata</i> . <i>Geodia areolata</i> . <i>Chrotella cavernosa</i> . <i>Hemiasterella typus</i> . <i>Taprobane herdmani</i> . <i>Haliclona carteri</i> . <i>Callyspongia fibrosa</i> . <i>Gelliodes fibulatus</i> . <i>Biemna fortis</i> . <i>Biemna ciocalyptoides</i> . <i>Myxilla dendyi</i> . <i>Tedania migrescens</i> . <i>Agelas mauritianus</i> . <i>Clathria spicata</i> . <i>Clathria whiteleggii</i> . <i>Clathria spongiosa</i> . <i>Aulospongos tubulatus</i> . <i>Rhabderemia indica</i> . <i>Hemectyonilla involutum</i> . <i>Higginsia robusta</i> . <i>Raspailopsis cervicornis</i> . <i>Axinella durissima</i> . <i>Phakellia radiata</i> . <i>Hymeniacidon virgultosa</i> . <i>Spongionella nigra</i> .
45	38	<i>Leuconia wasinensis</i> . <i>Dercitopsis minor</i> . <i>Stelletta mauritiana</i> . <i>Ecionemia acervus</i> . <i>Geodia perarmata</i> . <i>Geodia areolata</i> . <i>Chondrilla australiensis</i> . <i>Tetilla cranium</i> . <i>Paratetilla bacca</i> . <i>Acanthotetilla hemisphaerica</i> . <i>Spirastrella cuspidifera</i> . <i>Placospongia carinata</i> . <i>Tethya repens</i> . <i>Theonella discifera</i> . <i>Taprobane herdmani</i> . <i>Microscleroderma hirsutum</i> . <i>Haliclona tabernacula</i> . <i>Haliclona seychellensis</i> . <i>Haliclona tuberosa</i> . <i>Haliclona carteri</i> . <i>Oceanapia fistulosa</i> . <i>Oceanapia canalis</i> . <i>Callyspongia subarmigera</i> .

Station.	Depth in m.	Name.
		<i>Callyspongia confæderata.</i>
		<i>Callyspongia fibrosa.</i>
		<i>Callyspongia spinosissima.</i>
		<i>Callyspongia barodensis.</i>
		<i>Callyspongia rowi.</i>
		<i>Acanthancora stylifera.</i>
		<i>Lithoplocamia lithistoides.</i>
		<i>Clathria aculeata.</i>
		<i>Microciona affinis.</i>
		<i>Microciona densa.</i>
		<i>Microciona longistyla.</i>
		<i>Acarnus topsenti.</i>
		<i>Endectyon thurstoni.</i>
		<i>Hemectyonilla involutum.</i>
		<i>Higginsia petrosioides.</i>
		<i>Higginsia robusta.</i>
		<i>Raspailopsis cervicornis.</i>
		<i>Amorphinopsis megalorhaphis.</i>
		<i>Axinella lamellata.</i>
		<i>Axinella agariciformis.</i>
		<i>Axinella durissima.</i>
		<i>Axinella bidderi.</i>
		<i>Axinella dragmaxioides.</i>
		<i>Phakellia radiata.</i>
		<i>Hymeniacidon virgultosa.</i>
		<i>Hymeniacidon variospiculata.</i>
		<i>Raspigella dendyi.</i>
		<i>Pseudaxinyssa tenuispiculata.</i>
		<i>Darwinella simplex.</i>
		<i>Aplysina mollis.</i>
		<i>Druinella ramosa.</i>
		<i>Spongionella pulvilla.</i>
		<i>Spongionella nigra.</i>
		<i>Spongionella frondosa.</i>
		<i>Cacospongia herdmani.</i>
		<i>Cacospongia symbiotica.</i>
		<i>Dysidea cinerea.</i>
		<i>Hircinia arenosa.</i>
		<i>Carteriospongia cordifolia.</i>
141	44	<i>Adocia fibulatus</i> var. <i>microsigma.</i>
161	46	<i>Ciocalypta penicillus.</i>
10	55	<i>Grantessa zanzibarica.</i>
		<i>Haliclona camerata.</i>
		<i>Haliclona contignata.</i>
		<i>Adocia pigmentifera.</i>
		<i>Petrosia nigricans.</i>
		<i>Biemna trirhaphis.</i>
		<i>Iotrochota baculifera.</i>
		<i>Tedania nigrescens.</i>
		<i>Clathria aculeata.</i>
139	57	<i>Oceanapia elastica.</i>
		<i>Adocia sagittarius.</i>
A	65-68	<i>Callyspongia clathrata.</i>
43	95	<i>Leucosolenia gardineri.</i>
		<i>Grantessa glabra.</i>
		<i>Geodia globostellifera.</i>

Station.	Depth in m.	Name.
		<i>Tetilla ozeata.</i>
		<i>Chrotella cavernosa.</i>
		<i>Suberites ramulosus.</i>
		<i>Theonella lacerata.</i>
		<i>Antho tawiensis.</i>
		<i>Amorphinopsis megalorhaphis.</i>
		<i>Spongia officinalis.</i>
151	101	<i>Ptilocaulis spiculifera.</i>
112	113	<i>Stelletta herdmani.</i>
		<i>Ecionemia acervus.</i>
		<i>Geodia perarmata.</i>
		<i>Timea tethyoides.</i>
		<i>Damirina verticillata.</i>
		<i>Microciona affinis.</i>
		<i>Axinella durissima.</i>
		<i>Axinella conulosa.</i>
		<i>Axinella ventilabrum.</i>
		<i>Axinella flabello-reticulata.</i>
		<i>Axinella massalis.</i>
		<i>Phakellia radiata.</i>
		<i>Collocalypta digitata.</i>
		<i>Raspaiella salomonensis.</i>
		<i>Raspaiella ? suluensis.</i>
		<i>Raspaiella dendyi.</i>
111	.(Uncertain, probably 73-165). 73-165	<i>Dercitopsis ceylonica</i>
		<i>Spirastrella spinispirulifer.</i>
		<i>Diplastrella gardineri.</i>
		<i>Timea capitatostellifera.</i>
		<i>Discodermia natalensis.</i>
		<i>Theonella discifera.</i>
		<i>Haliclona cribriformis.</i>
		<i>Haliclona contignata.</i>
		<i>Haliclona irregularis.</i>
		<i>Haliclona cerebrum.</i>
		<i>Adocia digitata.</i>
		<i>Petrosia testudinaria.</i>
		<i>Petrosia mauritiana.</i>
		<i>Petrosia nigricans.</i>
		<i>Oceanapia media.</i>
		<i>Callyspongia subarmigera.</i>
		<i>Hymedesmia murrayi.</i>
		<i>Desmapsamma anchorata.</i>
		<i>Microciona anonyma.</i>
		<i>Raspailopsis cervicornis.</i>
		<i>Amorphinopsis megalorhaphis.</i>
		<i>Phakellia radiata.</i>
		<i>Aplysina primitiva.</i>
	(Uncertain)	<i>Stelletta herdmani.</i>
		<i>Ecionemia acervus.</i>
		<i>Penares intermedia.</i>
		<i>Erylus lendenfeldi.</i>
		<i>Spirastrella cuspidifera.</i>
		<i>Oceanapia zoologica.</i>
		<i>Callyspongia diffusa.</i>
		<i>Aplysinopsis reticulata.</i>
89	193	<i>Sphinctrella gracilis.</i>

Station.	Depth in m.	Name.
		<i>Geodia sphaeroides.</i>
		<i>Ophlitaspongia minor.</i>
		<i>Antho tawiensis.</i>
		<i>Plocamilla manaarensis.</i>
		<i>Phakellia radiata.</i>
11	207	<i>Oceanapia incrustata.</i>
		<i>Guitarra fimbriata.</i>
106	212	<i>Fangophilina submersa.</i>
24	73-220	<i>Grantessa sycilloides.</i>
		<i>Sycon munitum.</i>
		<i>Dercitopsis minor.</i>
		<i>Geodia areolata.</i>
		<i>Chrotella eurystoma.</i>
		<i>Suberites kelleri.</i>
		<i>Polymastia clavata.</i>
		<i>Trachycladus tethyoides.</i>
		<i>Trachycladus cervicornis.</i>
		<i>Hemiasporea complicata.</i>
		<i>Haliclona contignata.</i>
		<i>Haliclona irregularis.</i>
		<i>Callispongia diffusa.</i>
		<i>Callispongia spinosissima.</i>
		<i>Biemna fortis.</i>
		<i>Mycale murrayi.</i>
		<i>Mycale sulcata.</i>
		<i>Myxilla simplex.</i>
		<i>Ectyodoryx raphidiophora.</i>
		<i>Phorbas styliferus.</i>
		<i>Clathria whiteleggi.</i>
		<i>Microcionia longitoxa.</i>
		<i>Hemectyonilla involutum.</i>
		<i>Sigmaxinella megastyla.</i>
		<i>Aplysina euplectella.</i>
		<i>Dysidea fragilis.</i>
157	229	<i>Farrea spirifera.</i>
		<i>Yodomia perfecta.</i>
		<i>Pachastrella monilifera.</i>
		<i>Pæcillastra schulzi.</i>
		<i>Pachymatisma bifida.</i>
		<i>Suberites ramulosus.</i>
		<i>Laxosuberites longispiculus.</i>
		<i>Tentorina sigmatophora.</i>
		<i>Polymastia murrayi.</i>
		<i>Theonella pulchrifolia.</i>
		<i>Haliclona flagellifer.</i>
		<i>Haliclona irregularis.</i>
		<i>Haliclona expansa.</i>
		<i>Petrosia nigricans.</i>
		<i>Hamacantha mindanaensis.</i>
		<i>Hamacantha simplex.</i>
		<i>Ectyodoryx coralliophila.</i>
		<i>Microcionia rhopalophora.</i>
9	245	<i>Haliclona cf. ochracea.</i>
		<i>Petrosia nigricans.</i>
		<i>Tedania nigrescens.</i>
		<i>Lithoplocamia lithistoides.</i>



Station.	Depth in m.	Name.
		<i>Clathria spongiosa.</i>
		<i>Echinodictyum jousseaumei.</i>
123	256-366	<i>Phakellia radiata.</i>
		<i>Pæcillastra schulzii.</i>
		<i>Sphinctrella gracilis.</i>
		<i>Discodermia emarginata.</i>
177	274-366	<i>Corallistes bowerbanki.</i>
		<i>Sphinctrella gracilis.</i>
		<i>Thenea wyvillii.</i>
		<i>Polymastia murrayi.</i>
		<i>Guitarra fimbriata.</i>
		<i>Lissodendoryx ciocalyptoides.</i>
		<i>Echinoplocamia arbuscula.</i>
35	441	<i>Higginsia robusta.</i>
		<i>Axinella bidderi.</i>
145 E	494	<i>Radiella sarsii.</i>
145	494	<i>Semperella cucumis.</i>
		<i>Euplectella simplex.</i>
		<i>Holascus fibulatus.</i>
		<i>Thenea centrotyla.</i>
109	640	<i>Myliusia verrucosa.</i>
		<i>Dysidea fragilis.</i>
176	695	<i>Hyalonema affine.</i>
122	732	<i>Pheronema giganteum.</i>
		<i>Thenea muricata.</i>
108	781	<i>Aphrocallistes beatrix.</i>
		<i>Radiella sarsii.</i>
		<i>Tentorium semisubcrites.</i>
		<i>Thenea grayi.</i>
152	609-915	<i>Sarostegia oculata.</i>
		<i>Pleurochorium annandalei.</i>
		<i>Pachastrella monilifera.</i>
		<i>Sphinctrella theneides.</i>
		<i>Geodia sphaeroides.</i>
		<i>Hamacantha mindanænsis.</i>
54	1046	<i>Sarostegia oculata.</i>
		<i>Aphrocallistes beatrix.</i>
		<i>Placoplegma solutum.</i>
		<i>Subcrites ramulosus.</i>
		<i>Mycale massa</i> var. <i>oceanica.</i>
		<i>Mycale topsenti.</i>
		<i>Lissodendoryx damirioides.</i>
		<i>Lissodendoryx tubicola.</i>
		<i>Ectyodoryx coralliophila.</i>
		<i>Axinella bidderi.</i>
119	1207-1463	<i>Monorhaphis dives.</i>
42	1415	<i>Sarostegia oculata.</i>
175	1618	<i>Suberites domuncula.</i>
118	1789	<i>Monorhaphis</i> sp.
162	1829	<i>Farrea occa</i> subsp. <i>erecta.</i>
		<i>Sarostegia oculata.</i>
50	1939	<i>Callyspongia spinosissima.</i>
185	2001	<i>Hemectyonilla involutum.</i>

## Order HEXACTINELLIDA.

## Sub-order AMPHIDISCOPHORA.

## Family PHERONEMATIDÆ.

Genus *Pheronema* Leidy.*Pheronema giganteum* Schulze.

*Pheronema giganteum* Schulze, 1886 : 66 ; Schulze, 1887 : 250, pls. xlv, xlvi ; Schulze, 1893 : 996 ; Schulze, 1893 : 563 ; Ijima, 1927 ; 10, pl. v, figs. 1-7 ; Okada, 1932 : 6.

OCCURRENCE.—Stn. 122, January 22, 1934, Zanzibar Area (5° 21' 24" S., 39° 23' 00" E. to 5° 22' 36" S., 39° 22' 18" E.), 745 m., bottom grey-green mud.

DISTRIBUTION.—Kei Island; Timor; Japan; 204-276 m., blue mud.

Genus *Semperella* Gray.*Semperella cucumis* Schulze.

*Semperella cucumis* Schulze, 1895 : 45, pl. ix, figs. 1-16 ; Schulze, 1902 : 41, pl. viii, figs. 1-16 ; Schulze, 1904 : 103, pls. xx-xxii, pl. xxiv, fig. 1.

OCCURRENCE.—Stn. 145, March 31, 1934, Maldive Area (4° 58' 42" S., 73° 16' 24" E.), 494 m., bottom green mud and sand.

DISTRIBUTION.—Andamans; Nicobars ; 296-730 m.

## Family MONORHAPHIDÆ.

Genus *Monorhaphis* Schulze.*Monorhaphis dives* Schulze.

*Monorhaphis dives* Schulze, 1904 : 121, pl. xliii, figs. 1-20.

OCCURRENCE.—Stn. 119, January 19, 1934. Zanzibar Area (6° 29' 24" S., 39° 49' 54" E. to 6° 32' 00" S., 39° 53' 30" E.), 1204 m.

REMARKS.—The specimen consists of a badly-preserved fragment, but the spiculation puts its identity beyond doubt.

DISTRIBUTION.—Coast of Somaliland ; 1644 m.

*Monorhaphis* sp.

OCCURRENCE.—Stn. 118, Zanzibar Area (4° 05' 54" N., 41° 10' 12" E. to 4° 17' 00" N., 41° 11' 48" E.), 1789 m., bottom globigerina ooze.

REMARKS.—Three spicules were obtained with the following dimensions : 63, 133 and 138 cm. long and 1.5, 3 and 4 mm. diameter at the centre respectively. No body spicules were found.

## Family HYALONEMATIDÆ.

Genus *Hyalonema* Gray.*Hyalonema affine* Brandt.

*Hyalonema affine* Brandt, 1857 : 606 ; Brandt, 1859 : fol. ; Schultze, 1860 : 9 ; Marshall, 1875 : 224 ; *H. (Stylocalyx) apertus* Schulze, 1887 : 59 ; *H. apertum* Schulze, 1887 : 214, pls. xxxvii, xxxviii ; Schulze, 1893 : 554 ; Schulze, 1895 : 39, pl. viii, figs. 1-6 ; *H. maehrentali* Schulze, 1895 : 41, pl. viii, figs. 7-11 ; *H. affine reticulatum* Schulze, 1899 : 112 ; *H. affine japonicum* Schulze, 1899 : 112 ; *H. affine* Schulze, 1902 : 27, pl. vii, figs. 1-11 ; *H. apertum* Schulze, 1904 : 91 ; pls. xxvii, xxviii ; *H. apertum maehrentali* Ijima, 1927 : 72, pl. ii, fig. 15, pl. iv, figs. 1-8, text-figs. 7-15 ; *H. apertum* Okada, 1932 : 19 ; *H. apertum solidum* Okada, 1932 : 21, pl. i, figs. 1-2.

OCCURRENCE.—Stn. 176, May 2, 1934, Gulf of Aden (12° 04' 06" N., 50° 38' 36" E.), 695 m., bottom green mud and sand.

REMARKS.—Two poorly preserved specimens represent this species. In both the body is badly damaged, but in one of them the stalk bears an *Actinia* (like that figured by Schulze, 1902, pl. vii, fig. 1a) and below this a *Palythoa*. The body in both specimens is 30 mm. high and the stalk 140 mm. long.

DISTRIBUTION.—Japan ; East Indies ; Indian Ocean (W. of Sumatra, Nicobars, Andamans) ; 204-1886 m., bottom green mud, Pteropod ooze.

## Sub-order HEXASTEROPHORA.

## Tribe HEXACTINOSA.

## Sub-tribe CLAVULARIA.

## Family FARREIDÆ.

Genus *Farrea* Bowerbank.*Farrea spirifera* Ijima.

*Farrea spirifera* Ijima, 1927 : 156, pl. xiii, figs. 10-15.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area (4° 43' 48" N., 72° 55' 24" E. to 4° 44' 00" N., 72° 54' 18" E.), 229 m., bottom coral rock.

DISTRIBUTION.—Kei Is. ; 595-984 m.

*Farrea occa* Bowerbank, subsp. *erecta* Ijima.

*Farrea occa erecta* Ijima, 1927 : 132, pl. x, figs. 1-12, ?13-16.

OCCURRENCE.—Stn. 162, April 10, 1934, Maldive Area (8° 08' 30" N., 72° 58' 00" E.), 1829 m., bottom grey mud.

DISTRIBUTION.—Between Celebes and the Philippines (several localities) ; 278-1633 m.

Genus *Sarostegia* Topsent.

*Sarostegia oculata* Topsent.

*Sarostegia oculata* Topsent, 1904 : 4, figs. 1-3 ; Topsent, 1904 : 377 ; *Ramella tubulosa* Schulze, 1904 : 38, pl. xiv, figs. 7-9 ; *Sarostegia oculata* Dendy, 1916 : 219, pl. xlii, figs. 19-31, pl. xliii, figs. 32-36 ; Gravier, 1918 : 20 ; Topsent, 1928 : 87, pl. i, figs. 11-12, pl. iv, fig. 5.

OCCURRENCE.—Stn. 42, October 27, 1933, South Arabian Coast (17° 26' 00" N., 55° 49' 00" E.), 1415 m., bottom rock and mud ; Stn. 54, November 3, 1933, South Arabian Coast (21° 50' 00" N., 59° 52' 00" E.), 1046 m., bottom green mud ; Stn. 152, April 4, 1934, Maldive Area (4° 49' 00" N., 72° 46' 30" E. to 4° 48' 00" N., 72° 40' 00" E.), 878 m., bottom green sand ; Stn. 153, April 4, 1934, Maldive Area (4° 45' 36" N., 72° 52' 12" E. to 4° 42' 36" N., 72° 50' 24" E.), 256 m. ; Stn. 162, April 10, 1934, Maldive Area (8° 08' 30" N., 72° 58' 00" E.), 1829 m., bottom grey mud.

DISTRIBUTION.—Cape Verde Islands, 598-1694 m. (Topsent, Schulze) ; off Sumatra, 677 m. (Schulze) ; Seychelles, 823 m. (Dendy) ; Maldives, 256-1829 m. (Murray Expedition).

Sub-tribe SCOPULARIA.

Family EURETIDÆ.

Genus *Pleurochorium* Schrammen.

*Pleurochorium annandalei* (Kirkpatrick).

*Eurete annandalei* Kirkpatrick, 1908 : 21, pl. i, figs. 1-13 ; *Pleurochorium annandalei* Ijima, 1927 : 196 ; *P. amandelei* (err.), Ijima, 1927 : 368.

OCCURRENCE.—Stn. 152, April 4, 1934, Maldive Area (4° 49' 00" N., 72° 46' 30" E. to 4° 48' 00" N., 72° 40' 00" E.), 878 m., bottom green sand.

DISTRIBUTION.—Off Ceylon (925 and 1207 m.).

Genus *Myliusia* Gray.

*Myliusia verrucosa* Ijima.

*Myliusia verrucosa* Ijima, 1927 : 217, pl. xxiv, figs. 17-19.

OCCURRENCE.—Stn. 109, January 13, 1934, Zanzibar Area (5° 10' 36" S., 39° 33' 48" E.), 640 m., light grey mud.

DISTRIBUTION.—Sulu Archipelago ; 564 m.

Family APHROCALLISTIDÆ.

Genus *Aphrocallistes* Gray.

*Aphrocallistes beatrix* Gray.

*Aphrocallistes beatrix* Gray, 1858 : 224 ; Gray, 1858 : 115, pl. xi ; Gray 1867 : 507 ; Thomson, 1868 : 119 ; *Iphiteon beatrix* Bowerbank, 1869 : 325 ; *Aphrocallistes bocagei* Wright, 1870 : 77, pl. i ; Kent, 1870 : 248 ; Schmidt, 1870 : 17, pl. ii, figs. 1, 11, 12 ; Carter, 1873 : 358 ; *A. beatrix* Carter, 1873 : 359 ; *A. bocagei* Marshall, 1875 : 150, pl. xiv, figs. 42-45 ; Marshall, 1876 : 124 ; Schmidt, 1880 : 48, pl. vii, fig. 5 ; *A. beatrix* Priest, 1884 : 12, pl. ii, figs. 14-15 ; *A. bocagei* Schulze, 1886 : 74 ; *A. beatrix* Schulze, 1886 : 75 ; *A. ramosus* Schulze, 1886 : 75 ; *A. beatrix* Schulze, 1887 : 311, pl. lxxxiv, figs.

9-10; *A. bocagei* Schulze, 1887 : 313, pl. lxxxii, pl. lxxxiv, figs. 1-8; *A. ramosus* Schulze, 1887 : 319, pl. lxxxvi; *A. bocagei* Kirkpatrick, 1889 : 446; Topsent, 1892 : 32; *A. ramosus* Topsent, 1892 : 32, pl. v, fig. 12, pl. vii, fig. 10; *A. beatrix* Schulze, 1896 : 68, pl. vii, figs. 1-13; *A. ramosus* Schulze, 1896 : 76, pl. vii, fig. 14; *A. bocagei* Schulze, 1896 : 78, pl. viii, figs. 1-11; Schulze, 1899 : 85; *A. vastus* Schulze, 1896 : 86, pl. xviii, fig. 3; *A. beatrix* Schulze 1900 : 38; *A. bocagei* Schulze, 1900 : 39; *A. beatrix* Schulze, 1902 : 87, pl. xv, figs. 1-13; *A. bocagei* Schulze, 1902 : 93, pl. xvi; *A. ramosus* Schulze, 1902 : 97, pl. xv, fig. 14; *A. beatrix* Schulze, 1904 : 48, pls. xi-xiii, pl. xiv, figs. 1-6; *A. bocagei* Topsent, 1904 : 48; *A. beatrix* Stephens, 1915 : 430; *A. beatrix orientalis* Ijima, 1916 : 173; *A. beatrix* Arnesen, 1920 : 10; Dendy and Burton, 1926 : 226; Ijima, 1927 : 286, pl. xxiv, figs. 20-30, pl. xxv, text-fig. 35; Burton, 1928 : 15; Topsent, 1928 : 95; Burton and Rao, 1932 : 302; *A. beatrix orientalis* Okada, 1932 : 51, pl. iv, fig. 1.

OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50' 00" N., 59° 52' 00" E.), 1046 m., bottom green mud; Stn. 108, January 13, 1934, Zanzibar Area (5° 18' 06" N., 39° 24' 12" E. to 5° 14' 30" N., 39° 25' 36" E.), 781 m., bottom grey mud.

REMARKS.—Examples of this species occur commonly in deep-sea dredgings, probably more frequently than any other Hexactinellid. The geographical range is within the limits of approximately 5° S. and 50° N., except in the Atlantic where (Burton, 1928) it has been recorded for the Greenland-Iceland area.

DISTRIBUTION.—Atlantic (Greenland, Iceland, SW. Ireland, Azores, Bermuda, West Indies, Morocco, Canaries, Cape Verde Islands, St. Helena, St. Paul, Ascension Is.); Indian Ocean (off Bombay, Bay of Bengal, Nicobars, Andamans, Mergui); Dutch East Indies; Pacific (Philippines, Japan); 164-1966 m.

#### Tribe LYSSACINOSA.

##### Family LEUCOPSACASIDÆ.

##### Genus *Placoplegma* Schulze.

##### *Placoplegma solutum* Schulze.

*Placoplegma solutum* Schulze, 1896 : 63, pl. vi, figs. 11-17; Schulze, 1897 : 544; Schulze, 1902 : 80, pl. xiv, figs. 11-17; Ijima, 1898 : 43; Schulze, 1904 : 28, pl. vii.

OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50' 00" N., 59° 52' 00" E.), 1046 m., bottom green mud.

DISTRIBUTION.—Dar-es-Salaam; Bay of Bengal (12° N., 90° E.); 2925-3008 m.

##### Family EUPLECTELLIDÆ.

##### Genus *Euplectella* Owen.

##### *Euplectella simplex* Schulze.

*Euplectella simplex* Schulze, 1896 : 15, pl. ii, figs. 1-13; Schulze, 1902 : 51, pl. x, figs. 1-13; Schulze, 1904 : 21, pl. iv, figs. 4-5.

OCCURRENCE.—? Stn. 145, March 31, 1934, Maldives Area (4° 58' 42" S., 73° 16' 24" E.), 494 m., bottom green mud and sand.

DISTRIBUTION.—Zanzibar; Andamans; W. of Sumatra; 402-1668 m., bottom blue mud.

Genus *Holascus* Schulze.*Holascus fibulatus* Schulze.

*Holascus fibulatus* Schulze, 1886 : 40 ; Schulze, 1887 : 87, pl. xv, figs. 1-5, pl. xvi ; Schulze, 1896 : 10 ; Schulze, 1904 : 8.

OCCURRENCE.—Stn. 145, March 31, 1934, Maldive Area ( $4^{\circ} 58' 42''$  S.,  $73^{\circ} 16' 24''$  E.), 494 m.

DISTRIBUTION.—Dar-es-Salaam ; between Kerguelen and South Africa ; South of Australia ; 2516-2959 m., bottom Globigerina ooze, Diatom ooze, red clay.

## Order CALCAREA.

## Family HOMOCÆLIDÆ.

Genus *Leucosolenia* Bowerbank.*Leucosolenia gardineri* Dendy.

*Leucosolenia gardineri* Dendy, 1913 : 2, pl. i, figs. 1-2, pl. iii, figs. 1-3 ; Dendy and Row, 1913 : 725 ; *L. gardineri*, var. *vergensis* Kumar, 1924 : 21.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast ( $17^{\circ} 29' 00''$  N.,  $55^{\circ} 47' 00''$  E.), 95 m.

DISTRIBUTION.—Indian Ocean ; 18-25 m.

## Family LEUCASCIDÆ.

Genus *Leucetta* Haeckel.*Leucetta pyriformis* Dendy.

*Leucetta pyriformis* Dendy, 1913 : 11, pl. i, fig. 7, pl. iv, fig. 3 ; Dendy and Row, 1913 : 734.

OCCURRENCE.—Stn. 148, April 3, 1934, Maldive Area ( $4^{\circ} 53' 12''$  N.,  $72^{\circ} 54' 30''$  E. to  $4^{\circ} 51' 24''$  N.,  $72^{\circ} 53' 06''$  E.), 27 m., bottom soft cream mud.

DISTRIBUTION.—Cargados Carajos ; 82 m.

## Family HETEROPIIDÆ.

Genus *Grantessa* Lendenfeld.*Grantessa zanzibaris* Jenkin.

*Grantessa zanzibaris* Jenkin, 1908 : 449, figs. 98-102 ; *G. zanzibarensis* Dendy and Row, 1913 : 753.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea ( $13^{\circ} 31' 00''$  N.,  $42^{\circ} 31' 00''$  E.), 55 m.

DISTRIBUTION.—Zanzibar ; 11-15 m.

*Grantessa glabra* Row.

*Grantessa glabra* Row, 1911 : 203, pl. xix, fig. 6 ; Dendy and Row, 1913 : 752.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast ( $17^{\circ} 29' 00''$  N.,  $55^{\circ} 47' 00''$  E.), 95 m.

DISTRIBUTION.—Red Sea.

*Grantessa sycilloides* (Schuffner).

*Sycortis sycilloides* Schuffner, 1877 : 420, pl. xxv, fig. 10 ; *Grantessa sycilloides* Dendy and Row, 1913 : 753.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand and shells.

REMARKS.—It is probable that *Grantessa glabra* Row, from the Red Sea, is synonymous with *G. sycilloides*.

DISTRIBUTION.—Mauritius.

## Family SYCETTIDÆ.

Genus *Sycon* Risso.*Sycon munitum* Jenkin.

*Sycon munitum* Jenkin, 1908 : 443, fig. 91 ; Dendy and Row, 1913 : 747.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shingle and (?) rock.

DISTRIBUTION.—Zanzibar ; 13 m.

Genus *Leuconia* Grant.*Leuconia wasinensis* (Jenkin).

*Leucilla wasinensis* Jenkin, 1908 : 454, fig. 104 ; *Leucandra wasinensis* Dendy, 1913 : 24, pl. ii, fig. 5 ; Dendy and Row, 1913 : 772.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—East Africa (Wasin) ; Saya da Malha ; 11–100 m.

## Order TETRAXONIDA.

## Sub-order HOMOSCLEROPHORA.

## Family PLAKINIDÆ.

Genus *Dercitopsis* Dendy.*Dercitopsis ceylonica* Dendy.

*Dercitopsis ceylonica* Dendy, 1905 : 66, pl. ii, fig. 1.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), depth uncertain (probably between 73 and 165 m.).

DISTRIBUTION.—Ceylon, 182 m.

*Dercitopsis minor* Dendy.

*Dercitopsis minor* Dendy, 1916 : 229, pl. xlv, fig. 1, pl. xlv, fig. 1 ; Dendy and Frederick, 1924 : 489.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand and shell ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Indian Ocean (Cargados Carajos, Amirante, Egmont Reef); 55–80 m.; Western Australia (Abrolhos Island).

Sub-order STREPTASTROSCLEROPHORA.

Family PACHASTRELLIDÆ.

Genus *Yodomia* Lebwohl.

*Yodomia perfecta* Dendy.

*Yodomia perfecta* Dendy, 1916 : 232, pl. xlv, fig. 2, pl. xlv, fig. 3.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Saya de Malha); 273 m.

Genus *Pachastrella* Schmidt.

*Pachastrella monilifera* Schmidt.

*Pachastrella monilifera* Schmidt, 1868 : 15, pl. iii, fig. 7; *P. abyssi* Schmidt, 1870 : 64, pl. vi, fig. 4; Carter, 1876 : 407; Schmidt, 1880 : 68; Sollas, 1888 : 104, pl. x, fig. 5, pl. xi, figs. 1–31; *P. monilifera* Sollas, 1888 : 110; Topsent, 1892 : 41; Topsent, 1894 : 380, pl. xv, fig. 4; *P. ovisternata* Lendenfeld, 1894 : 439, pl. i, figs. 1–3; *P. monilifera* Topsent, 1901 : 343; 1902 : 346; *P. caliculata* Kirkpatrick, 1902 : 227, pl. ii, fig. 4, pl. iii, fig. 4; *P. isorrhopa* Kirkpatrick, 1902 : 228, pl. ii, fig. 5, pl. iii, fig. 5; *P. monilifera* Lendenfeld, 1903 : 75; *P. ovisternata* Lendenfeld, 1903 : 75; *P. monilifera* Topsent, 1904 : 92, pl. ii, fig. 2; *P. chuni* Lendenfeld, 1906 : 238, pl. xxxviii, figs. 2–45; *P. caliculata* Lendenfeld, 1906 : 243, pl. xxxix, figs. 1–13; *P. monilifera* Topsent, 1913 : 609; Ferrer, 1914 : 7; *P. ovisternata* Ferrer, 1914 : 7; *P. monilifera* Stephens, 1915 : 13; Babić, 1921 : 92; Babić, 1922 : 285, fig. U; Burton, 1926 : 9; Topsent, 1928 : 132.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock; Stn. 152, April 4, 1934, Maldive Area ( $4^{\circ} 49' 24''$  N.,  $72^{\circ} 46' 30''$  E. to  $4^{\circ} 48' 42''$  S.,  $72^{\circ} 40' 30''$  E.), 878 m., bottom green sand; Stn. 153, April 4, 1934, Maldive Area ( $4^{\circ} 45' 36''$  N.,  $72^{\circ} 52' 12''$  E. to  $4^{\circ} 42' 36''$  N.,  $72^{\circ} 50' 24''$  E.), 256 m.; Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

REMARKS.—Except that the larger megascleres, in the specimens from Stn. 157, have the ends of the cladi more commonly bifid than usual, these specimens are fairly representative. Through them, the recorded distribution of the species is carried into the Indian Ocean for the first time, apart from the specimens found off South Africa.

DISTRIBUTION.—Atlantic Ocean (SW. Ireland, Spain, Portugal, Morocco, Azores, Madeira, Canaries, West Africa, South Africa, Tristan da Cunha, Gough Is.); Mediterranean; Natal; 61–2165 m.; bottom rock, sand, mud, gravel or broken shells.

Genus *Pæcillastra* Sollas.

*Pæcillastra schulzii* (Sollas).

*Normania schulzii* Sollas, 1886 : 185; *N. laminaris* Sollas, 1886 : 186; *N. tenuilaminaris* Sollas, 1886 : 186; *Pæcillastra schulzei* Sollas, 1888 : 79, pl. ix, figs. 1–29; *P. laminaris* Sollas, 1888 : 84; *P. tenuilaminaris* Sollas, 1888 : 85, pl. v, figs. 17–18; *Pachastrella schulzii*, Lendenfeld, 1903 : 77; *P. laminaris* Lendenfeld, 1903 : 78; *P. tenuilaminaris* Lebwohl, 1914 : 72, pl. vii, figs. 16–25, pl. ix, fig. 21; Dendy, 1916 : 230, pl. xlv, fig. 2; *Pæcillastra tenuilaminaris* Dendy and Burton, 1926 : 238.



OCCURRENCE.—Stn. 123, January 22, 1934, Zanzibar Area ( $5^{\circ} 19' 00''$  S.,  $39^{\circ} 32' 30''$  E. to  $5^{\circ} 19' 12''$  S.,  $39^{\circ} 33' 30''$  E.), 256–366 m., bottom green mud, sand and rock; Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Amirante, Andamans, Mergui Archipelago); Heard Island; Amboina; Pacific Ocean (Japan and east of the Philippines); 73–1829 m.

Genus *Sphinctrella* Schmidt.

*Sphinctrella gracilis* Sollas.

*Sphinctrella gracilis* Sollas, 1888 : 89, pl. xiii, figs. 1–2; Topsent, 1902 : 12; *Pachastrella gracilis* Lendenfeld, 1903 : 74; *Sphinctrella gracilis* Topsent, 1904 : 88, pl. iv, fig. 2; Topsent 1928 : 131.

OCCURRENCE.—Stn. 89, December 7, 1933, Northern area of Arabian Sea ( $19^{\circ} 14' 00''$  N.,  $69^{\circ} 42' 18''$  E.), 193 m., bottom sand, shells and rock; Stn. 123, January 22, 1934, Zanzibar Area ( $5^{\circ} 19' 00''$  S.,  $39^{\circ} 32' 30''$  E. to  $5^{\circ} 19' 12''$  S.,  $39^{\circ} 33' 30''$  E.), 256–366 m., bottom green mud, sand and rock; Stn. 177, May 2, 1934, Gulf of Aden ( $12^{\circ} 01' 54''$  N.,  $50^{\circ} 39' 12''$  E.), 366 m., bottom green mud and rock.

REMARKS.—There are three typical specimens, 10, 20 and 60 mm. across respectively. The smallest resembles closely the specimen figured by Topsent (1904), and the largest is closely similar in external form to *Thenaea fenestrata* Sollas, with a flattened, discoidal form and a series of equatorial pore-recesses.

DISTRIBUTION.—Azores, Madeira, Cape Verde Is.; 182–1229 m.

*Sphinctrella theneides* sp. n.

(Text-fig. 1.)

HOLOTYPE.—B.M. 1936.3.4.313.

OCCURRENCE.—Stn. 152, April 4, 1934, Maldive Area ( $4^{\circ} 49' 24''$  N.,  $72^{\circ} 46' 30''$  E. to  $4^{\circ} 48' 42''$  N.,  $72^{\circ} 40' 30''$  E.), 878 m., bottom green sand.

DIAGNOSIS.—Sponge subspherical; surface hispid; oscules and pores in equatorial recesses at opposite sides of body, each protected by a fringe of long spicules; texture firm; colour, in spirit, pale yellowish-brown; skeleton of radially-arranged oxea, with a subectosomal layer of short-shafted orthotriænes, more rarely dichotriænes; microscleres streptasters of two sizes.

Spicules :

oxea, 6.0–8.0 by 0.04–0.056 mm.,

orthotriænes, cladi 0.48–0.8 by 0.032–0.05 mm., shaft of same length or slightly longer,

dichotriænes, rare, of similar dimensions,

streptasters 0.022–0.05 mm. across, larger with 4–5 rays.



TEXT-FIG. 1.—*Sphinctrella theneides* sp. n. Oxeote,  $\times 50$  and orthotriæne  $\times 50$ , with group of streptasters,  $\times 500$ .

Family THENEIDÆ.

Genus *Thenea* Gray.

*Thenea* Gray, 1867 : 541 ; *Tisiphonia* Thomson, 1869 : 712 ; *Dorvillia* Kent, 1870 : 293 ; *Wyvillethomsonia* Wright, 1870 : 80 ; *Dorvilia* Poctá, 1883 : 382 ; *Clavellomorpha* Hansen, 1885 : 19 ; *Thisiphonia* Ledenfeld, 1887 : 563 ; *Theuca* Lundbeck, 1907 : 559.

GENOTYPE.—*Tethea muricata* Bowerbank, 1864 : 25, figs. 35, 304, 305.

DIAGNOSIS.—Theneidæ with radially-arranged oxea and long-shafted triænes ; microscleres metasters ; with special pore-areas.

REMARKS.—In dealing with the species belonging to the genus *Thenea*, it becomes quickly apparent that the differences between them are comparatively slight. Previous writers have tended to base their diagnoses on differences in (a) shape and size of the microscleres, (b) shape and size of the megascleres, and (c) external form, in this order of importance.

Of the first, the shape and size of the microscleres, it is only too obvious, when a comparative survey is made, that the microscleres of the various species of *Thenea* are much more closely alike than those of, say, the genus *Stelletta*. There are differences in size, but comparatively little difference in shape. Even the presence or absence of spines on the rays is a matter of doubtful importance, as we know by analogy with other genera

of Tetraxonida and with the Hexactinellida. As to size, we find that this varies sufficiently to make it almost worthless in the definition of species. It has been shown, again and again, by various writers, that the microscleres of all Tetraxonida not only vary in size, but that whole categories of spicules may be absent from some parts of an individual sponge, or may be completely lacking in a given individual.

The same remarks may be made of the megascleres which, unlike those of *Stelletta* and other such genera, are remarkably uniform, consisting of oxea, dichotriænes, anatriænes and protiaenes.

The external form, however, does offer a possible basis for distinction, as its characters appear to be comparatively stable. It seems possible, therefore, that using, primarily, the external characters, supplemented by details of spiculation, we shall arrive at the most satisfactory basis for classification of this genus.

Before passing to consideration of the species of *Thenea*, it may be useful to consider the range of variation in both size and shape of the spicules. Lendenfeld (1906, p. 222) records that in the two specimens of his *Thenea microclada*, one had streptasters (die grossen Metaster) 0.15–0.29 mm. across, and the other, 0.27–0.4 mm. across. This is a significant record, and one which I followed up by examining the accumulated material of *T. muricata* in the British Museum collection. Using only specimens from the coast of Norway, the type-locality of the species, I found that, in specimens otherwise readily identifiable as *T. muricata* (Bowerbank), the size and shape of the larger streptasters varied considerably. The first six observations were as follows :

Specimen.	Small streptasters. (mm.)	Large streptasters. (mm.)
The holotype . . .	0.021–0.031 across .	Absent.
B.M. 10.1.1.1127 . . .	0.021–0.028 „ .	R 0.05–0.08 across.
B.M. 10.1.1.1119 . . .	0.02–0.035 „ .	C 0.07–0.48 „
B.M. 94.11.16.120 . . .	0.03–0.035 „ .	R 0.06–0.14 „
B.M. 10.1.1.746.iii . . .	0.007–0.02 „ .	C 0.05–0.1 „
B.M. 10.1.1.834 . . .	Absent .	Absent.

(R = rare ; C = Common.)

Not only do the dimensions vary but the characters of the spicules do also. Thus, in some large streptasters, with rays of equal length, the thickness varies perceptibly. In some instances, the rays of the larger streptasters are strongly microspined instead of smooth.

Turning to the rest of the skeleton, and to the morphology, we find that, in addition to variation in size, the following may be found :

(1) The dichotriænes may be replaced by a varying but usually small quantity of plagiotriænes ; but in one specimen the large triænes were exclusively plagiotriænes.

(2) The anatriænes and less commonly the protriænes, may be differentiated into two categories.

(3) The sponge, while usually attached to the substratum by a root-tuft and ropes of long spicules, may, in rare instances, be attached direct to a stone. This may lead to a deformity in shape of the sponge.

(4) The oscules may be single, numerous but small, or converted into irregular crypts similar to the equatorial poriferous crypts. The increase in number of the oscules is usually, not always, correlated with increase in size, and especially with a dorso-ventral flatten-

ing of the sponge. The formation of osculiferous crypts, in some cases, at all events, appears to be due to malformation of the sponge body (see 3 above), or to the presence of smothering algæ, or organic débris.

(5) The hispidation of the surface may be very much developed (cf. Lendenfeld, 1906, pl. xxi, fig 6, *T. mesotricæna*) or the specimens may appear practically non-hispid, almost smooth, without any equatorial fringe. But of a hundred or more specimens examined, the great majority showed little obvious hispidation apart from the fringe around the oscules and the equatorial crypts.

(6) The body of the sponge tends to flatten and the oscules to multiply in number with the size of the specimen.

Using the external form as the basis for specific identification the position can be expressed as in Text-fig. 2 and in the key on page 187. Both represent however, an ideal situation. In practice there are difficulties which can be but sparingly dealt with in print. For example, the smallest specimens (presumably juvenile) of all species are very similar no matter from which part of the world they come. The body is rounded, usually surmounting a proportionately long stalk, with a pair of crypts at opposite sides of the body. Presumably these crypts are poral and oscular respectively. A typical example is seen in Lendenfeld (1906, pl. xxiii, fig. 39) and in the same work (pl. xxii, figs. 11, 12) young specimens can be seen still attached to the parent. With further growth, so it would seem, changes in shape take place producing the characters exemplified in Text-fig. 2.

The next difficulty lies in the fact that the shapes given in Text-fig. 2 are only rarely attained in this definite form. Either by some slight variation, more often by some distortion as a result of preservation, the ideal characters tend to be masked. Thus, in a jar of some 20 *Thenaea grayi* in the British Museum collection only two or three approach the typical form shown in Text-fig. 2. For the rest, some are so damaged that specific morphological characters are indefinable, in others the equatorial crypts extend in places into the upper surface producing an appearance deceptively like that of some specimens of *T. muricata*, where the oscules may be in oscular crypts (as in *T. valdiviæ* Lendenfeld, 1906, pl. xviii, fig. 11). If then, instead of a group of 20 specimens, the collector had in this case brought back one only, identification might have been rendered difficult if not impossible. Or the subsequent determination might have been misleading.

There is a third difficulty. The spiculation, as regards both megascleres and microscleres, is comparatively uniform throughout the genus. So long as the known specimens numbered a few scores it was possible to note and use the small variations in spicular characters. Now, when the British Museum collections alone run into hundreds, the variation and gradations to be found in the total range of recorded specimens are such that we may say for all practical purposes that the spiculation is uniform throughout the genus. Identification must therefore depend upon external characters correlated, where these characters are distorted, with geographical distribution.

The five species, if such they be, listed on p. 187, have a well ordered distribution, which is consistent with what is known of the distribution of sponges generally. Thus, *T. centrotyla* is recorded from the eastern and southern Indian Ocean; *T. grayi*, from the Indian Ocean, Philippines, and Australia. *T. wyvillii*, from the Philippines; *T. fenestrata*, from the Galapagos area, Florida and West Africa and *T. muricata* from the North Atlantic, Arctic Ocean and Japan. There is, therefore, nothing in their distribution to suggest that this grouping is unreasonable.

The typical characters of the 5 species are illustrated in the following key:

KEY TO THE SPECIES OF *THENEA*.

1	{	Oscules equatorial, set in a cribriform pit at opposite side of body from pore-bearing crypt . . . . .	2
		Oscules apical . . . . .	3
2	{	Skeleton includes microxea . . . . .	<i>centrotyla</i>
		Skeleton without microxea . . . . .	<i>grayi</i>
3	{	Oscules small, or situated in an irregular apical cribriform crypt . . . . .	4
		Oscules in a large shallow depression . . . . .	<i>wywillii</i>
4	{	Body dorso-ventrally flattened, with an equatorial series of small pore-bearing crypts . . . . .	<i>fenestrata</i>
		Body usually subspherical, rarely dorso-ventrally flattened, and pore-bearing crypts more or less continuous . . . . .	<i>muricata</i>

*Thenea centrotyla* Lendenfeld.

*Thenea centrotyla* Lendenfeld, 1906 : 184, pl. xx, figs. 26–31; *T. corallophila* Dendy and Burton, 1926 : 232, fig. 3; *T. andamanensis* Dandy and Burton, 1926 : 235, fig. 4.

OCCURRENCE.—Stn. 145, March 31, 1934, Maldive Area (4° 58' 42" S., 73° 16' 24" E.), 494 m., bottom green mud and sand.

DIAGNOSIS.—Sponge subspherical, with upper surface flattened; oscular and poral recesses situated equatorially and at opposite ends of the body; surface hispid; texture firm; colour, in spirit, light greyish-brown to brown; skeleton of radially-arranged oxea, dichotriænes, anatriænes, of which there may be more than one category, large protriænes and small promesotriænes; microscleres streptasters, triacts and microxea.

Spicules :

oxea, 6·8–7·6 by 0·068–0·08 mm.,

oxea, 4·5 by 0·017 mm.,

dichotriænes, cladome 2·4–2·8 mm. across, rhabdome 4·2–5·8 by 0·07 mm. across.

anatriænes, large, cladi 0·1–0·3 mm. chord, rhabdome 6·8 by 0·013–0·03 mm.,

anatriænes, small, cladi 0·017–0·03 mm. chord, rhabdome 6·8 by 0·009–0·01 mm.,

protriænes, cladi 0·6–0·8 mm. long, rhabdome 3·6–6·2 by 0·085–0·1 mm.,

promesotriænes, cladi 0·17–0·28 mm. long, rhabdome 8·0–8·5 by 0·034–0·04 mm.,

streptasters, 0·024–0·1 mm. long, passing with no clear distinction into tetracts,

triacts and diacts with rays 0·07–0·3 by 0·007–0·016 mm.,

microxea, usually centrotylote, 0·16–0·45 by 0·005–0·016 mm.

DISTRIBUTION.—SW. of Ceylon; Andamans; New Amsterdam Is. (southern Indian Ocean); 738–2414 m.

REMARKS.—*Thenea corallophila* and *T. andamanensis* differ, according to Dendy and Burton, in the presence of a root-tuft and minute short-shafted surface anatriænes in *T. andamanensis*, and the much greater abundance of the larger triacts and dichotriacts and the smaller size of the microxea in that species. In view of our present knowledge of the range of variation in species of *Thenea*, neither of these seems to present adequate grounds for specific distinction. Further, re-examination of the types has shown that spicules v, t, s, w, of Text-fig. 4 (*T. corallophila*) are also present in *T. andamanensis*, although rare. Moreover, there seems to have been an error in the measurement of the microxea of *T. corallophila*, which are rarely more than 0·25 mm. long.

[Although *T. fenestrata* has not been recorded for the Indian Ocean, its inclusion here makes complete the revision of the genus *Thenea*.]

*Thenea fenestrata* (Schmidt).

*Tisiphonia fenestrata* Schmidt, 1880 : 71, pl. x, fig. 2 ; *Thenea fenestrata* Sollas, 1886 : 185 ; *T. wrightii* Sollas, 1886 : 185 ; Sollas, 1888 : 63, pl. viii, figs. 11–20 ; *T. fenestrata* Sollas, 1888 : 71, pl. viii, figs. 1–8 ; *Ancorina (Thenea) fenestrata* Lendenfeld, 1903 : 55 ; *A. (T.) wrightii* Lendenfeld, 1903 : 58 ; *Thenea fenestrata* Wilson, 1904 : 88, pl. xiii, figs. 2–4, 6–7, 9 ; *T. echinata* Wilson, 1904 : 91, pl. xii, figs. 1–9 ; *T. lamelliformis* Wilson, 1904 : 95, pl. xii, figs. 10–13, pl. xiii, fig. 1 ; *T. pyriformis* Wilson, 1904 : 98, pl. xiii, figs. 5, 8, 10, 11.

DIAGNOSIS.—Sponge irregularly discoidal, with equatorial pore-recesses and with one or more small oscules on upper surface ; surface even, hispid ; texture firm ; colour, in spirit yellowish- to whitish-grey or brown ; skeleton of radially-arranged oxea, dichotriænes, anatriænes and protriænes occasionally with tylota ; microscleres streptasters, sometimes of two distinct sizes.

Spicules :

oxea, sometimes differentiated into two sizes 0.5–0.9 by 0.012–0.07 mm.,  
dichotriænes, cladome 1.6–2.7 mm. across, rhabdome 3.1–6.0 by 0.03–0.1 mm.,  
antriænes, cladi 0.1–0.2 mm. chord, rhabdome 0.4–0.7 mm. long by 0.01–0.03 mm.  
thick,  
anatriænes, of root-tuft, cladi 0.085–0.25 mm. chord, rhabdome (very long ?) by  
0.02 mm. thick,  
protriænes (sometimes absent, or replaced by tylota), cladi 0.5–0.8 mm. long,  
rhabdome 4.0–6.0 by 0.05–0.1 mm.,  
streptasters, of two sizes, with larger streptasters sometimes scarce or even  
absent, 0.028–0.047 and 0.07–0.35 mm. across (largest microscleres being  
triaacts, tetracts or pentaacts).

DISTRIBUTION.—Galapagos Islands ; Pacific coasts of Mexico and South America ; West Indies ; Brazil ; West Africa ; 900–4115 m. ; bottom mud, ooze or sand.

REMARKS.—According to the findings of Schmidt, Sollas and Wilson, the range of *T. fenestrata* includes the tropical Atlantic, from Africa to America, and also the tropical eastern Pacific. *T. wrightii*, also from the tropical eastern Pacific, differs from *T. fenestrata* in comparatively minor details, the most obvious of which is the presence of tylota (? modified protriænes) instead of protriænes. *T. echinata*, also from the eastern tropical Pacific differs from *T. fenestrata* in unimportant differences in the spiculation and in minor differences in the oscular and equatorial fringes, and the same is true for *T. lamelliformis* from the same region.

*Thenea grayi* Sollas.

*Thenea grayi* Sollas, 1886 : 183 ; Sollas, 1888 : 65, pl. vi, figs. 21–22 ; *T. malindia* Lendenfeld, 1906 : 179, pl. xx, figs. 22–24 ; *T. microspina* Lendenfeld, 1906 : 180, pl. xx, fig. 21 ; *T. nicobarensis* Lendenfeld, 1906 : 181, pl. xx, figs. 18–20 ; *T. rotunda* Lendenfeld, 1906 : 189, pl. xx, fig. 25 ; *T. multiformis* Lendenfeld, 1906 : 217, pl. xxiii, figs. 1–21 ; *T. tyla* Lendenfeld, 1906 : 219, pl. xx, figs. 36–38 ; *T. megaspina* Lendenfeld, 1906 : 223, pl. xxi, figs. 16–22, pl. xxii, figs. 1–5 ; *T. grayi* Wilson, 1925 : 278, pl. xlv, figs. 1–2 ; *T. grayi*, var. *sulcata* Wilson, 1925 : 280.

OCCURRENCE.—Stn. 108, January 13, 1934, Zanzibar Area (5° 18' 06" S., 39° 24' 12" E. to 5° 14' 30" S., 39° 25' 36" E.), 781 m., bottom grey mud.

DIAGNOSIS.—Sponge subspherical or ovate to irregularly subspherical, with poral and oscular recesses situated more or less equatorially and at opposite sides of body; surface hispid; texture firm; colour, in spirit, greyish-white to light brown; skeleton of radially-arranged oxea, dichotriænes, anatriænes and protriænes; microscleres streptasters of three sizes.

Spicules :

oxea, 3.0–11.0 by 0.02–0.07 mm.,  
 dichotriænes, cladome 1.3–3.2 mm. across, rhabdome 2.2–5.8 by 0.03–0.1 mm.,  
 anatriænes, cladi 0.025–0.23 mm. chord, rhabdome 11.0 by 0.006–0.025 mm.,  
 anatriænes, of root tuft, cladi 0.035–0.09 mm. chord, rhabdome 4.0–10.3 by 0.004–0.018 mm.,  
 protriænes, cladi 0.2–1.0 mm. long, rhabdome 4.0–8.0 by 0.08–0.1 mm.,  
 streptasters, 0.015–0.036 mm. across, divided by size into three groups.

DISTRIBUTION.—East Africa, southern Indian Ocean, Nicobars; eastern Australia (off Sydney); Philippines; 400–3548 m.; bottom green mud.

REMARKS.—The specimens included under this heading can be segregated into two groups, that named *T. grayi* by Sollas and Wilson, from eastern Australia and the Philippines, and those described by Lendenfeld (1906) from the southern half of the Indian Ocean (from East Africa to the Nicobars) under seven different names. Yet all have a similar external form, with poral and oscular recesses equatorial and at opposite ends of the body, and all have the streptasters divided into groups of three sizes. There are, of course, differences in the size of the spicules, but the general occurrence of these two well-marked features leaves little doubt that all represent a single species.

#### *Thenea muricata* (Bowerbank).

*Tethea muricata* Bowerbank, 1858 : 308, pl. xxv, fig. 18; Bowerbank, 1862 : 782, pl. xxxi, figs. 14, 15; Bowerbank 1864 : 25, figs. 35, 304, 305; Gray, 1867 : 541; Bowerbank, 1868 : 131; *Wyvillethomsonia wallichii* Wright, 1870 : 80, pl. ii; *Dorvillia agariciformis* Kent, 1870 : 293, pl. 66; *Tisiphonia agariciformis* Schmidt, 1870 : 68; *Dorvillia agariciformis* Kent, 1871 : 37; ? *Hyalonema parvum* Sars, 1872 : 73; *Tethya agariciformis* Kent, 1872 : 211; *Tethea muricata* Bowerbank, 1872 : 115, pl. v, figs. 1–6; *Tisiphonia agariciformis* Thomson, 1873 : 74, fig. 7; Whiteaves, 1874 : 211; *Dorvillia echinata* Verrill, 1874 : 501; *Tethea muricata* Carter, 1878 : 174; *Wyvillethomsonia wallichii* Norman, 1879 : 13; *Stelletta profunditatis* Schmidt, 1880 : 70; *Tisiphonia agariciformis* Schmidt, 1880 : 71; Keller, 1880 : 271; *Thenea muricata* Vosmaer, 1882 : 5, pl. i, figs. 1–8, pl. ii, figs. 1–21, pl. iv, figs. 114–115; *Thenea wallichii* Sollas, 1882 : 427, pl. xvii; *Tisiphonia agariciformis* Schulze, 1882 : 708; *Thenea muricata* Carter, 1883 : 362; *Thenea wallichii* Carter, 1883 : 362; *Thenea muricata* Vosmaer, 1885 : 4; Hansen, 1885 : 18, pl. v, figs. 6–9, pl. vii, fig. 19; *Clavellomorpha minima* Hansen, 1885 : 19, pl. v, fig. 2; *Thenea wallichii* Marenzeller, 1886 : 17; *T. schmidtii* Sollas, 1886 : 183; *T. delicata* Sollas, 1886 : 185; *T. muricata* Levinsen, 1886 : 343, pl. xxix, fig. 1; *T. delicata* Sollas, 1888 : 60, pl. vi, figs. 10–20, pl. viii, figs. 9–10; *T. schmidtii* Sollas, 1888 : 67, pl. vii, figs. 1–2, pl. viii, figs. 21–22; *T. muricata* Sollas, 1888 : 95, pl. vii, fig. 3; *T. intermedia* Sollas, 1888 : 97, pl. vii, fig. 4; *T. muricata* Topsent, 1892 : 37; *T. schmidtii* Topsent, 1892 : 37; *T. muricata* Topsent, 1894 : 375, pl. xv, figs. 1–5; Lambe, 1896 : 202, pl. iii, fig. 4; *T. grayi* Thiele, 1898 : 23, pl. v, figs. 2–3; *T. grayi*, var. *lateralis* Thiele, 1898 : 23, pl. v, fig. 4; *T. compressa* Thiele, 1898 : 24, pl. v, figs. 5–6; *T. compacta* Thiele, 1898 : 24, pl. v, fig. 7; *T. calyx* Thiele, 1898 : 24, pl. v, figs. 9–10; *T. nucula* Thiele 1898 : 25, pl. v, fig. 8; *T. hemisphærica* Thiele, 1898 : 25, pl. v, fig. 12; *T. muricata* Lambe, 1900 : 26; Lambe, 1900 : 164; *Ancorina (Thenea) grayi* Lendenfeld, 1903 : 56; *A. (T.) grayi grayi* Lendenfeld, 1903 : 56; *A. (T.) grayi lateralis* Lendenfeld, 1903 : 57; *A. (T.) grayi compressa* Lendenfeld, 1903 : 57; *A. (T.) grayi thielei* Lendenfeld, 1903 : 57; *A. (T.) grayi calyx* Lendenfeld, 1903 : 57; *A. (T.) grayi nucula* Lendenfeld, 1903 : 57; *A. (T.) hemisphærica* Lendenfeld, 1903 : 57; *A. (T.) grayi irregularis*

Lendenfeld, 1903 : 57 ; *A. (T.) delicata* Lendenfeld, 1903 : 55 ; *A. (T.) schmidtii* Lendenfeld, 1903 : 58 ; *Thenaea schmidtii* Topsent, 1904 : 85 ; *T. valdiviæ* Lendenfeld, 1906 : 190, pl. xvii, figs. 6-49, pl. xviii, figs. 1-19, pl. xix, figs. 1-20, pl. xx, figs. 1-13 ; *T. bojeadori* Lendenfeld, 1906 : 209, pl. xx, figs. 32-33 ; *T. pendula* Lendenfeld, 1906 : 210, pl. xxii, figs. 6-19 ; *T. levis* Lendenfeld, 1906 : 215, pl. xx, figs. 34-35 ; *T. microclada* Lendenfeld, 1906 : 221, pl. xxiii, figs. 37-44 ; *T. megastrella* Lendenfeld, 1906 : 225, pl. xxiii, figs. 22-36 ; *T. muricata* Arndt, 1912 : 112 ; Topsent, 1913 : 12 ; *T. grayi*, var. *grayi* Lebwohl, 1914 : 27, pl. iv, figs. 1-47 ; *Ancorina (Thenaea) muricata* Babić, 1914 : 152, figs. 1-3 ; *Thenaea muricata* Stephens, 1915 : 11 ; *T. (muricata) schmidtii* Babić, 1915 : 276 ; Babić, 1916 : 389 ; *T. muricata* Stephens, 1917 : 3 ; Arnesen, 1920 : 13 ; *T. (muricata) schmidtii* Babić, 1921 : 92 ; Babić, 1922 : 282 ; *T. muricata* Ferrer, 1922 : 248 ; *T. schmidtii* Ferrer, 1922 : 248 ; Rezvoi, 1924 : 241 ; Rezvoi, 1928 : 75 ; Topsent, 1928 : 129 ; Hentschel, 1929 : 918 ; Burton, 1930 : 488 ; Burton, 1934 : 6.

OCCURRENCE.—Stn. 122, January 22, 1934, Zanzibar Area (5° 21' 24" S., 39° 23' 00" E. to 5° 22' 36" S., 39° 22' 18" E.), 745 m., bottom grey-green mud.

DIAGNOSIS.—Sponge spherical or subspherical, with conspicuous, equatorial pores, and usually with rooting processes ; surface strongly hispid ; oscules apical ; texture firm, fragile ; colour, in spirit, white to whitish- or yellowish-grey ; skeleton of radially-arranged oxea, dichotriænes, anatriænes and protriænes ; microscleres streptasters of varying sizes.

Spicules :

oxea 1.25-18.0 by 0.01-0.09 mm.,  
 dichotriænes, cladome 1.1-3.5 mm. across, rhabdome 1.5-12.0 by 0.037-0.15 mm.,  
 anatriænes, cladi 0.02-0.9 mm. chord, rhabdome 1.0-21.5 by 0.007-0.045 mm.,  
 protriænes, cladi 0.2-2.0 mm. long, rhabdome 8.0-21.5 by 0.02-0.95 mm.,  
 streptasters, 0.008-0.55 mm. long.

REMARKS.—There are twelve specimens, 25 to 60 mm. across, agreeing closely with those figured by Lendenfeld (1906) under *T. valdiviæ*. While identifying these the opportunity was taken to make a survey of all known specimens of *Thenaea*, particularly of those in the British Museum collection. As a result, it is possible to make the following tentative comments on the species included here, for the first time, as synonyms of *T. muricata*.

*Thenaea bojeadori* Lendenfeld is obviously a young specimen, and the dimensions of its spicules come well within the limits of those recorded for authentic specimens of *T. muricata*. The same may be said of *T. microclada* Lendenfeld. Others of the so-called species included as synonyms of *T. muricata*, for example, *T. delicata* Sollas, *T. levis* Lendenfeld, *T. megastrella* Lendenfeld, *T. microspina* Lendenfeld, *T. pendula* Lendenfeld and *T. schmidtii* Sollas, have all such strong general resemblance to *T. muricata* that it is not possible to recognize them apart, especially when we consider the range of variation in external form and spicules that can be found in typical examples of that species. The differences between *T. valdiviæ* Lendenfeld and *T. muricata* are said by Lendenfeld (1906, p. 207-208) to be the simple oscules in *T. muricata*, as against the oscular recesses in *valdiviæ*, together with the larger dimensions of the dichotriænes in *valdiviæ*. The variations already recorded for the oscular openings in *T. muricata* effectively dispose of the first point. As to the second, it need only be said that I have compared preparations of the holotype of *T. muricata* with preparations labelled by Lendenfeld "*Thenaea valdiviæ* : Valdivia," and that it is not possible to see any real differences between them, except for the absence of large streptasters in some specimens of *T. muricata*.

There is some difficulty about *T. pyriformis*, which although having a strong re-



semblance to *T. muricata* in spiculation, differs markedly in external form. Some light is shed on this by five specimens from Naples, in the British Museum collection, all of which are somewhat distorted in form, and one of which is singularly like *T. pyriformis* in appearance. This suggests two possibilities, either that *T. pyriformis* is a teratological form of *T. muricata*, or that *T. pyriformis* is a separate species found, so far, only in the Mediterranean and off the Pacific coast of Mexico. By the nature of things the second alternative is much the more unlikely. *T. hemispharica* (pl. v, fig. 11) appears to be slightly coated with debris, which may account for its atypical appearance; and *T. irregularis* (pl. v, fig. 12) abundantly coated with foreign matter, is almost identical with a deformed specimen from Norway, in the British Museum collection.

In conclusion it suffices to say that in the series in the British Museum, of *Thenaea muricata* from the North Atlantic, may be found an exactly similar set of specimens to those described by Thiele from Japan under half a dozen different specific names.

*Thenaea wyvillii* Sollas.

*Thenaea wyvillii* Sollas, 1886 : 184; Sollas, 1888 : 74, pl. vi, figs. 1-9; *Ancorina (Thenaea) wyvillii* Lendenfeld, 1903 : 56.

OCCURRENCE.—Stn. 177, May 2, 1934, Gulf of Aden ( $12^{\circ} 01' 54''$  N.,  $50^{\circ} 39' 12''$  E.), 366 m., bottom green mud and rock.

DIAGNOSIS.—Sponge composed of a lower, rounded portion roofed above by a cupola-like upper part; surface even, minutely hispid; oscules large, apical; texture firm; colour, in spirit, whitish; skeleton of radially-arranged oxea, dichotriænes, anatriænes and protriænes; microscleres streptasters.

Spicules :

oxea, 7.9 by 0.07-0.084 mm.,  
 dichotriænes, cladome 1.4 mm. across, rhabdome 4.28 by 0.1 mm.,  
 anatriænes, cladi 0.095 mm. chord, rhabdome 0.88 by 0.008 mm.,  
 anatriænes, radical, cladi 0.1 mm. chord, rhabdome 18.2 by 0.025 mm.,  
 protriænes, cladi 0.5 mm. long, rhabdome 6.8 by 0.072 mm.,  
 streptasters, of three sizes, 0.02-0.025, 0.035 and 0.07-0.11 mm. across, largest with 2-7 rays.

DISTRIBUTION.—Philippines; Gulf of Aden; West Africa; 174-1300 m., bottom mud and rock.

REMARKS.—The fringes to both the equatorial and the oscular recesses are developed to a varying degree in the four specimens of the Murray Collection. In the two smallest, there is none. In those ranging from 25 to 40 mm. across the fringes are most strongly developed. In one, 65 mm. across, they are feebly developed (? disappearing); and in the four largest they are again absent. Except in the smallest specimen, in which it is relatively simple, the oscular recess is never less than a quarter and usually one-third or more of the total diameter of the sponge.

A specimen obtained by the "Rosaura" from West Africa while typical in all other respects, appears to have been unattached and without basal tuft. A few incipient and small tufts of long spicules at the base may be the vestiges of rooting ropes.

## Sub-order ASTROSCLEROPHORA.

## Family STELLETTIDÆ.

Genus *Stelletta* Schmidt.*Stelletta purpurea* Ridley.

*Stelletta purpurea* Ridley, 1884 : 473, pl. xl, fig. E, pl. xliii, fig. j ; Burton, 1929 : 415.

(For synonymy see Burton, 1926 : 44.)

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shell and Lithothamnion.

DISTRIBUTION.—Suez Canal ; Red Sea ; Indian Ocean ; Indo-Pacific ; Australia ; New Zealand ; Antarctic ; littoral to 275 m.

*Stelletta herdmani* Dendy.

(Text-fig. 2.)

*Stelletta herdmani* Dendy, 1905 : 77, pl. ii, fig. 6.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar area (5° 04' 18" S., 39° 14' 12" E.), depth uncertain, 73–165 ; Stn. 112, January 15, 1934, Zanzibar Area (5° 04' 12" N., 39° 13' 18" E.), 113 m., bottom coral rock.

REMARKS.—The specimen from Stn. 45 is fairly typical, but the other two can be assigned to this species only with hesitation. The specimen from Stn. 111 is small and irregularly massive. The skeleton is a halichondroid reticulation of oxea, with occasional triænes lying just under the surface, or protruding slightly beyond it. The triænes are like those of *S. herdmani*, but with occasional diænes. The microscleres include ectosomal strongylasters, 0.012–0.017 mm. diameter and anthasters 0.02 mm. diameter. In possessing anthasters the specimen differs from *S. herdmani* but makes a near approach to *S. centrotyla* Lendenfeld.

The specimen from Stn. 112 is massive but flattened, and agrees in appearance and texture with *S. grubii* as figured by Topsent (1894, pl. xiii, fig. 7), and with specimens from Port Erin in the British Museum collection. The skeleton agrees with that of the holotype of *S. herdmani* except that the cladi of the triænes are longer and the shafts shorter. Also, while most of the cladi are normal (see Text-fig. 2A, B), many have recurved ends (Text-fig. 2C, D, E), or are reduced to two or one (Text-fig. 2F, G), or have the ends of the cladi bifid.

DISTRIBUTION.—Ceylon and west coast of India, down to 183 m.

*Stelletta mauritiana* (Dendy).

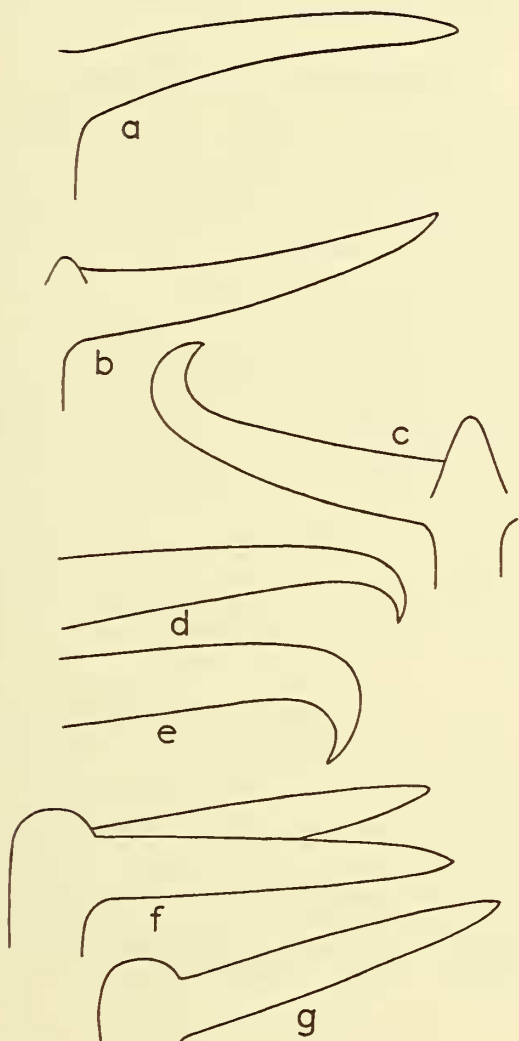
*Dragmastra lactea*, var. *mauritiana* Dendy, 1916 : 238, pl. xlvi, fig. 7.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

REMARKS.—Here are two specimens assigned to *Stelletta mauritiana* (Dendy) with some hesitation. The first is clavate, 50 mm. high and 9 mm. across at its broadest point.

The second is cushion-shaped, 10 mm. across. In both the surface is even but harsh to the touch, the colour is pale yellow to light brown. Both are without oscules. The texture is firm.

The spicules are similar in both specimens: oxea, 1.4 by 0.047 mm. (against 0.75 by 0.02 mm. in the holotype); dichotriænes with cladome 0.16–0.43 mm. across, and shaft



TEXT-FIG. 2.—*Stelletta herdmani* Dendy. Cladi of orthotriænes to show abnormalities.  $\times 300$ . Most of the cladi in the specimen from Stn. 112 are as in *a* and *b*, but many have the shape shown in *c* or *d* and *e*. The more abnormal forms shown in *f* and *g* are not uncommon and there is a tendency in some for the cladi to bifurcate near the distal end.

0.48 by 0.02–0.048 mm. Occasionally orthotriænes, of similar size to the dichotriænes, may be seen. The microscleres are oxyasters and oxyspherasters, up to 0.016 mm. diameter, but, whereas in the holotype the majority are oxyspherasters of about 0.008 mm. diameter, with a few oxyasters up to 0.016 mm., in these two specimens the majority are oxyasters of 0.012–0.016 mm. diameter. Other features in which differences from the holotype can be seen are, that in these two specimens no trichodragmata were found, but cortical oxea,

0.25 by 0.002–0.003 mm., are present projecting in an almost continuous palisade at the surface. Cortical oxea may be present in the holotype, but the surface of that specimen is obscured by a *Latrunculia*.

DISTRIBUTION.—Mauritius.

### Genus *Ecionemia* Bowerbank.

#### *Ecionemia acervus* Bowerbank.

*Ecionemia acervus* Bowerbank, 1862 : 1101, pl. lxxiii, fig. 1 ; Bowerbank, 1864 : 173, pl. xxviii, fig. 355 ; Bowerbank, 1873 : 322, pl. xxx, figs. 1–6 ; *Stelletta acervus* Ridley, 1884 : 627 ; *S. bacillifera* Carter, 1887 : 78, pl. vi, figs. 9–14 ; *Ecionema acervus* Sollas, 1888 : 196 ; *E. nigrum* Sollas, 1888 : 198 ; *E. rotundum* Sollas, 1888 : 198 ; *Thalassomora nigra* Lendenfeld, 1888 : 40 ; *Ecionema rotundum* Topsent, 1893 : 175 ; *Stelletta lobata* Kieschnick, 1896 : 527 ; ? *S. truncata* Kieschnick, 1896 : 528 ; *Ancorina simplex* Lendenfeld, 1897 : 96, pl. ix, figs. 12–34 ; *Ecionema baculifera* Lindgren, 1897 : 485 ; *Stelletta lobata* Kieschnick, 1898 : 27 ; *S. truncata* Kieschnick, 1898 : 32 ; *Ecionema baculifera* Lindgren, 1898 : 335, pl. xvii, fig. 17, pl. xix, fig. 27 ; *E. baculifera* Lindgren, 1899 : 88 ; *Ecionemia agglutinans* Thiele, 1899 : 7, pl. iv, fig. 1, pl. v, fig. 2 ; *Stelletta truncata* Kieschnick, 1900 : 553 ; *Ecionemia bacilliferum* Kirkpatrick, 1900 : 131 ; *E. cribrata* Thiele, 1900 : 31, pl. ii, fig. 7 ; *E. cinerea* Thiele, 1900 : 32, pl. ii, fig. 8 ; *E. nigrescens* Thiele, 1900 : 34, pl. ii, fig. 9 ; *Ancorina amboinensis* Lendenfeld, 1903 : 63 ; *A. lobata* Lendenfeld, 1903 : 63 ; *A. nigra* Lendenfeld, 1903 : 64 ; *A. acervus*, Lendenfeld, 1903 : 64 ; *A. rotunda* Lendenfeld, 1903 : 65 ; *A. agglutinans* Lendenfeld, 1903 : 65 ; *A. cinerea* Lendenfeld, 1903 : 65 ; *A. bacillifera* Lendenfeld, 1903 : 66 ; *A. simplex* Dragnevitsch, 1905 : 3 ; Dragnevitsch, 1906 : 441 ; *Ecionemia carteri* Dendy, 1905 : 79, pl. i, fig. 5, pl. iii, fig. 1 ; *Ancorina bacillifera* Baer, 1906 : 7, pl. i, fig. 3, pl. iii, figs. 11–19 ; *Ecionemia cinerea* Bösraug, 1913 : 236, pl. xviii, figs. 23–44, pl. xix, figs. 1–53 ; *E. carteri* Dendy, 1916 : 242 ; *Ancorina brevidens* Dendy and Frederick, 1924 : 493, pl. xxvi, fig. 9 ; *Ecionemia cribrata* Wilson, 1925 : 297.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), depth uncertain, 73–165 m. ; Stn. 112, January 15, 1934, Zanzibar Area (5° 04' 57" S., 39° 13' 18" E.), 113 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Zanzibar, Seychelles, Amirante, Ceylon, Christmas Island, Mergui Archipelago) ; Indo-Pacific (Java, Celebes, Amboina, Ternate, Philippines, Fiji) ; Australia (Great Barrier Reef, SW. Australia) ; West Africa (*teste* Sollas, 1888, but this locality should be accepted doubtfully) ; littoral to 23 m.

### Genus *Penares* Gray.

#### *Penares intermedia* (Dendy).

*Plakinastrella intermedia* Dendy, 1905 : 67, pl. i, fig. 4, pl. ii, fig. 2 ; *P. schulzei* Dendy, 1905 : 69, pl. ii, fig. 3.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" N., 39° 14' 12" E.), depth uncertain, 73–165 m.

REMARKS.—Dendy's original figures suggest clearly that both the species described under *Plakinastrella* belong to *Penares*, and that there is little to distinguish them. Re-examination of the types amply confirms both points.

DISTRIBUTION.—Ceylon ; 183 m.

## Family GEODIIDÆ.

Genus *Geodia* Lamarck.*Geodia perarmata* Bowerbank.

*Geodia perarmatus* Bowerbank, 1873 : 8, pl. ii, figs. 1-11 ; *G. perarmata* Carter, 1880 : 131, pl. vi, figs. 32-35 ; Sollas, 1888 : 245 ; *Sidonops perarmata* Lendenfeld, 1903 : 101 ; *Geodia perarmata* Dendy, 1905 : 83 ; Burton, 1926 : 15.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom shells and sand ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 112, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

DISTRIBUTION.—Ceylon ; False Bay, South Africa ; 33-183 m.

*Geodia globostellifera* Carter.

*Geodia globostellifera* Carter, 1880 : 134, pl. vi, fig. 38 ; *Cydonium globostelliferum* Sollas, 1888 : 261 ; *Geodia globostellifera* Lendenfeld, 1903 : 111 ; *nec G. globostellifera* Ridley, 1884.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast ( $17^{\circ} 29' 00''$  N.,  $55^{\circ} 47' 00''$  E.), 95 m.

DISTRIBUTION.—Gulf of Manaar.

*Geodia areolata* Carter.

*Geodia areolata* Carter, 1880 : 133, pl. vi, figs. 36-37 ; Sollas, 1888 : 246 ; *Sidonops areolata* Lendenfeld, 1903 : 103 ; *Geodia areolata* Dendy, 1905 : 87.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73-220 m., bottom coarse sand and shells ; Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion ; Stn. 145, March 31, 1934, Maldive area ( $4^{\circ} 58' 42''$  S.,  $73^{\circ} 16' 24''$  E.), 494 m., bottom green mud and sand.

REMARKS.—The specimens are fairly typical in all respects except that the choanosomal oxyasters have a maximum diameter of 0.045 mm.

DISTRIBUTION.—Gulf of Manaar, up to 183 m.

*Geodia sphaeroides* (Kieschnick).

*Cydonium sphaeroides* Kieschnick, 1896 : 529 ; *Geodia arripiens* Lindgren, 1897 : 486 ; 1898 : 346, pl. xviii, figs. 10, 18, pl. xx, fig. 5 ; *Geodia sphaeroides* Thiele, 1900 : 41, pl. ii, fig. 14 ; Lendenfeld, 1903 : 110 ; Hentschel, 1912 : 314.

OCCURRENCE.—Stn. 89, December 7, 1933, Northern Area of Arabian Sea ( $19^{\circ} 14' 00''$  N.,  $69^{\circ} 42' 18''$  E.), 193 m., bottom sand, shells and rock ; Stn. 152, Maldive Area ( $4^{\circ} 49' 24''$  S.,  $72^{\circ} 46' 30''$  E. to  $4^{\circ} 48' 42''$  S.,  $72^{\circ} 40' 30''$  E.), 878 m., bottom green sand.

DISTRIBUTION.—Cochin-China ; Aru Is. ; Ternate ; 18-45 m.

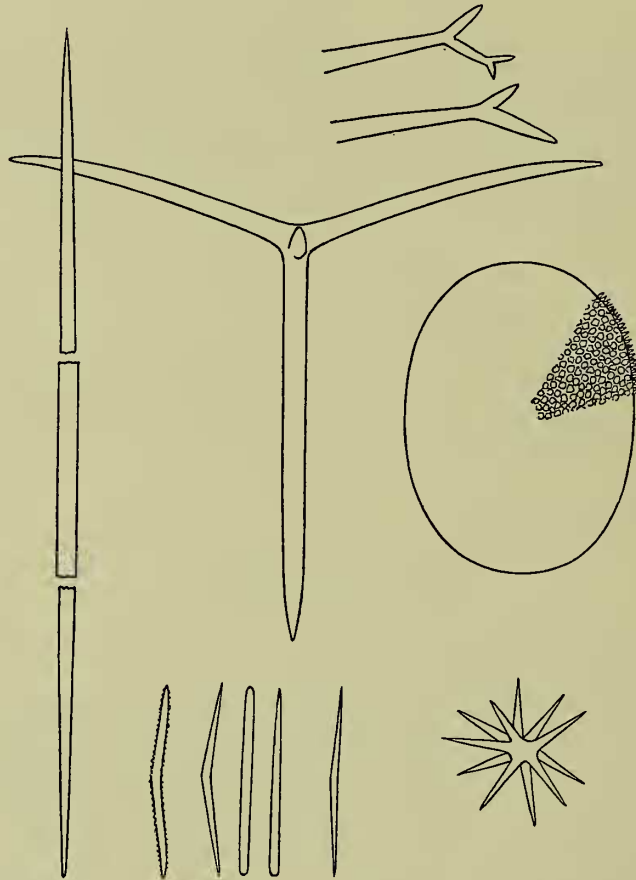
Genus *Pachymatisma* Bowerbank.

*Pachymatisma bifida* sp. n.

(Text-fig. 3.)

HOLOTYPE.—B.M. 1936.3.4.339.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.



TEXT-FIG. 3.—*Pachymatisma bifida* sp. n. Oxeote,  $\times 50$ , triæne, showing variation in ends of rays,  $\times 50$ , sterraster,  $\times 250$ , oxyaster,  $\times 500$ , and microoxea and microstrongyla,  $\times 250$ .

DIAGNOSIS.—Sponge massive, rounded; surface uneven, mainly non-hispid; oscules simple, 1–2 mm. diameter, distributed evenly over upper surface; texture hard; colour, in spirit, pale yellow; main skeleton of radially arranged oxea and dichotriænes (rarely orthotriænes); microscleres sterrasters, ectosomal microoxea to microstrongyla and choanosomal oxyasters.

Spicules:

- (1) oxea, 0.9 by 0.05 mm.,
- (2) triænes, with cladi irregular, bifid (rarely trifid or unbranched), cladome 0.8–1.0 mm. across, rhabdome 0.9–1.1 by 0.048–0.06 mm.,
- (3) sterrasters 0.12–0.16 mm. across,
- (4) microoxea to microstrongyla, usually centrotylote, 0.07–0.1 by 0.004–0.005 mm.,
- (5) choanosomal oxyasters, 0.04–0.06 mm. diameter.

Genus *Erylus* Gray.*Erylus lendenfeldi* Sollas.

*Stelletta euastrum* (pars) Carter, 1880 : 136, pl. vii, fig. 42 ; *Erylus lendenfeldi* Sollas, 1888 : 239 ; Lendenfeld, 1903 : 85 ; Dendy, 1916 : 257, pl. xlvii, fig. 4 ; *nec Stelletta euastrum* Schmidt.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), depth uncertain, 73–165 m.

DISTRIBUTION.—Freemantle, South Australia ; Amirante ; Indian Ocean ; 37–80 m.

## Family CHONDROSIIDÆ.

Genus *Chondrilla* Schmidt.*Chondrilla australiensis* Carter.

*C. australiensis* Carter, 1873 : 23, pl. i, figs. 10–14, 16 ; Lendenfeld, 1885 : 153 ; *C. papillata* Lendenfeld, 1885 : 153, figs. 13–16 ; *C. corticata* Lendenfeld, 1885 : 154, figs. 17–20 ; *C. papillata* Carter, 1886 : 278 ; *C. corticata* Lendenfeld, 1888 : 70 ; *C. australiensis* Lendenfeld, 1888 : 71 ; *C. papillata* Lendenfeld, 1888 : 71 ; *C. globulifera* Keller, 1891 : 327, pl. xviii, figs. 34–35 ; *C. australiensis* Lindgren, 1897 : 484 ; Lindgren, 1898 : 38 ; *C. ternatensis* Thiele, 1900 : 65, pl. iii, fig. 19 ; *C. australiensis* Dendy, 1905 : 132 ; *C. australiensis*, var. *lobata* Dendy, 1905 : 132 ; *C. australiensis* Hentschel, 1909 : 377 ; Hentschel, 1912 : 320 ; Dendy, 1916 : 101 ; Dendy, 1916 : 267 ; *Chondrillastra australiensis* Topsent, 1918 : 604 ; *C. papillata* Topsent 1918 : 606 ; *C. corticata* Topsent, 1918 : 606 ; *C. globulifera* Topsent, 1918 : 607 ; *C. ternatensis* Topsent, 1918 : 608 ; *C. australiensis* Dendy and Frederick, 1924 : 496 ; Burton, 1924 : 207 ; Burton and Rao, 1932 : 325.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Red Sea ; Indian Ocean (Okhamandal, Ceylon, Madras, Cargados Carajos, Amirante, Seychelles) ; Indonesia (Ternate, Aru Is.) ; Cochin-China ; Australia (Great Barrier Reef, Port Jackson, Port Phillip, SW. Australia, Abrolhos Is., Port Western) ; littoral to 68 m., bottom rocks with sand and coral, mud and shells.

Genus *Chondrosia* Nardo.*Chondrosia reniformis* Nardo.

*Chondrosia reniformis* Nardo, 1847 : 272 ; *Gummina gliricauda* Schmidt, 1862 : 38, pl. iii, fig. 20 ; *G. ecaudata* Schmidt, 1862 : 38, pl. iii, fig. 21 ; *Chondrosia reniformis* Schmidt, 1862 : 40 ; *C. gliricauda* Schmidt, 1864 : 30 ; *Chondrosia reniformis* Schmidt, 1864 : 30 ; *Gummina ecaudata* Koelliker, 1864 : 69, pl. viii ; *Chondrosia reniformis* Schmidt, 1868 : 1 ; Schulze, 1877 : 97, pl. viii ; Carter, 1881 : 248 ; Graeffe, 1882 : 315 ; *C. ramsayi* Lendenfeld, 1886 : 147, pl. iii, figs. 6–9 ; *C. reniformis* Vosmaer, 1887 : 325 ; (?) Levinsen, 1887 : 512 ; Lendenfeld, 1889 : 458, pl. xxvii, figs. 89, 90, 93, pl. xxix, figs. 94–112, pl. xxx, figs. 113–136, pl. xxxi, figs. 137–157, pl. xxxii, figs. 158–179, pl. xxxiii, figs. 180–187 ; Topsent, 1894 : 37 ; Lendenfeld, 1896 : 38, pl. i, figs. 7, 11, 12, pl. ix, figs. 118, 119 ; Topsent, 1896 : 568, pl. xxiii, figs. 1–5, pl. xxii, fig. 12b ; Topsent, 1897 : 428 ; Kirkpatrick, 1900 : 129 ; *C. corticata* Thiele, 1900 : 67, pl. iii, fig. 21 ; *C. debilis* Thiele, 1900 : 68 ; *C. reniformis* Dendy, 1905 : 133 ; Topsent, 1906 : 568 ; Hentschel, 1909 : 378 ; *C. reniformis* var. *minor* Hentschel, 1909 : 379, pl. xxiii, fig. 19 ; *C. reniformis* Hentschel, 1912 : 322 ; Stephens, 1915 : 437 ; Babić 1921 : 89 ; Babić, 1922 : 269 ; Topsent 1925 : 630 ; Topsent 1928 : 143 ; Burton and Rao, 1932 : 324 ; Burton, 1933 : 236 ; Burton, 1936 : 8.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

REMARKS.—This is essentially a species of tropical and subtropical waters and for this reason Levinsen's (1887 and 1893) records for the Kara Sea and Cattegat must be suspect. I have examined numerous collections from the British Isles, Norway and the Arctic and have not found this species among them. Yet it is practically never absent from collections made in warmer waters.

DISTRIBUTION.—? Kara Sea; ? Cattegat; Mediterranean; Cape Verde Islands; San Thomé; South Africa; Red Sea; Indian Ocean (Ceylon, Xmas Is.); Ternate, Amboina, Aru Is.; Australia (east, north-west and south-west coasts); Galapagos Is. littoral to 123 m., bottom sand, rock and coral.

Family TETILLIDÆ.

Genus *Tetilla* Schmidt.

*Tetilla cranium* (Müller).

*Alcyonium cranium* Müller, 1776 : 255; Müller, 1789 : 5, pl. lxxxv, fig. 1; *Tethya cranium* Lamarck, 1815 : 71; *Alcyonium cranium* Lamarck, 1816 : 347; *Spongia pilosa* Montagu, 1818 : 119, pl. xiii, figs. 1-3; *Tethya cranium* Fleming, 1828 : 519; *Tethium cranium* Blainville, 1834 : 544; *Tethea cranium* Johnston, 1842 : 83, pl. i, figs. 1-8; Bowerbank, 1864 : 183, pl. xxxi, fig. 362; Bowerbank, 1866 : 83; *Tethya cranium* Schmidt, 1866 : 14, pl. i, fig. 14; Gray, 1867 : 543; *Tethea cranium* Wright, 1870 : 224; *Craniella tethyoides* Schmidt, 1870 : 66, pl. vi, fig. 9; *Tethya cranium* Carter, 1871 : 104; *T. cranium* Carter, 1872 : 419, pl. xxii, fig. 9; *Tethea unca* Bowerbank, 1872 : 118, pl. v, figs. 7-10; *T. cranium* Bowerbank, 1874 : 35, 315, pls. xiv, lxxxix; *Tethya cranium*, var. *abyssorum* Carter, 1876 : 405, pl. xvi, fig. 49; *T. cranium*, var. *typica* Bowerbank, 1882 : 41; *T. cranium*, var. *acufera* Bowerbank, 1882 : 42; *T. cranium*, var. *abyssorum* Bowerbank, 1882 : 42; *Craniella mülleri* Vosmaer, 1885 : 6, pl. ii, figs. 9-15, pl. v, figs. 1-2; *Tethya cranium* Hansen, 1885 : 18, pl. v, figs. 3-4, pl. vii, fig. 16; *Craniella carteri* Sollas, 1886 : 181; *C. schmidtii* Sollas, 1886 : 182; *C. mülleri* Vosmaer, 1887 : 322; *Tethya sibirica* Fristedt, 1887 : 436, pl. xxiv, figs. 22-28, pl. xxviii, fig. 17; *Craniella schmidtii* Sollas, 1888 : 38-39, pl. xlii, figs. 20-21; *C. abyssorum* Sollas, 1888 : 50; *C. cranium* Sollas, 1888 : 51; *C. tethyoides* Sollas, 1888 : 54; *C. zetlandica* Sollas, 1888 : 55; *C. cranium* Topsent, 1892 : 36; *C. spinosa* Lambe, 1894 : 35, pl. iv, fig. 1; *C. cranium* Topsent, 1894 : 388, pl. xv, figs. 6-14; Lendenfeld, 1897 : 84; *C. globosa* Thiele, 1898 : 26, pl. v, fig. 15, pl. vii, fig. 14; *C. ovata* Thiele, 1898 : 27, pl. v, fig. 16, pl. vii, fig. 15; *C. varians* Thiele, 1898 : 27, pl. v, figs. 17-18, pl. vii, figs. 16-17; *C. cranium* Lambe, 1900 : 277; Lambe, 1900 : 164; *Tethya tethyoides* Lendenfeld, 1903 : 24; *T. oscari* Lendenfeld, 1903 : 25; *T. abyssorum* Lendenfeld, 1903 : 25; *Craniella cranium* (pars), Topsent, 1904 : 99; *C. elegans* Dendy, 1905 : 95, pl. iv, fig. 1; *C. cranium* Lundbeck, 1909 : 454; *Tethya cranium* Topsent, 1913 : 12, pl. iii, fig. 3, pl. v, fig. 12; *T. abyssorum* Topsent, 1913 : 13, pl. v, figs. 4-6; *Craniellopsis azorica* Topsent, 1913 : 15, pl. iii, fig. 2, pl. v, figs. 1-2; *Tethya ovata* Leibold, 1914 : 5, pl. i, figs. 1-29; *T. cranium*, Babić, 1921 : 91; Babić 1922 : 276, fig. P; Hentschel, 1929 : 916; *T. sibirica* Hentschel, 1929 : 916.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" B., 57° 02' 30" E.), 38 m., bottom Lithothamnion; Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

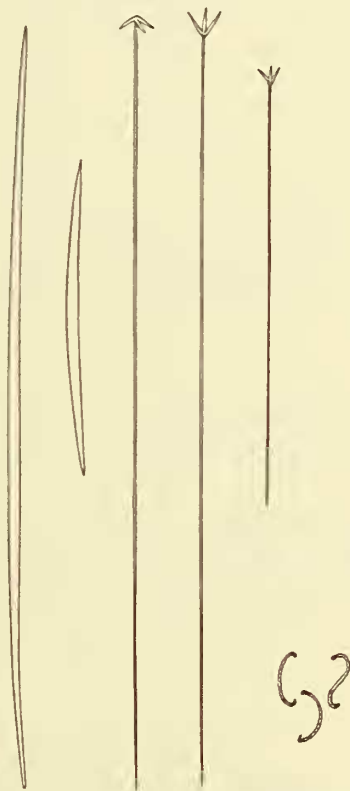
REMARKS.—Although there are only two specimens from the present collection, they constitute the third record from the Indian Ocean. This is the more remarkable since the species has been so frequently recorded elsewhere. The significance of the new record is, however, lost except it be related to our total knowledge of the species. It is necessary, therefore, to include here a complete synonymy list, such as has not been published hitherto. Included in this synonymy list should be *Craniella disigma* Topsent, characterized by the possession of two well-marked categories of sigmaspiræ, although otherwise identical with



*Tetilla cranium*. In a jar of 30 specimens, in the British Museum collection, identified by Carter as *Craniella cranium*, all are typical except one, which, while differing in no other character from the rest, has two well marked categories of sigmaspiræ. The differentiation of the sigmaspiræ would appear, therefore, to be of occasional and sporadic occurrence, and without taxonomic significance.

*Tetilla cranium* Müller grows typically in the deeper waters of the continental shelf and is distributed throughout the Arctic, the North Atlantic and North Pacific; and some specimens have been recorded from South Africa, Australasia and the Antarctic. It is spherical to oval in shape, with a minutely papillate surface and ranges in size from a few millimeters to some 300 mm. (exceptionally up to 500 mm.) in diameter. The skeleton consists of oxea, protriænes, anatriænes and sigmaspiræ with a cortical palisade of stout microxea.

DISTRIBUTION.—Arctic; western Atlantic to the Azores; South Africa (Natal); West Indies; Vancouver; Japan; Ceylon; 9–1828 m.



TEXT-FIG. 4.—*Tetilla oxcata* sp. n. Oxea, of two sizes, anatriænes, and protriænes of two sizes, all  $\times 500$  sigmaspiræ,  $\times 500$ .

*Tetilla oxcata* sp. n.

(Text-fig. 4.)

HOLOTYPE.—1936.3.4.377.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast ( $17^{\circ} 29' 00''$  N.,  $55^{\circ} 47' 00''$  E.), 95 m.

DIAGNOSIS.—Sponge subspherical, with incipient root-tuft; surface subpapillate, with faintly-marked longitudinal grooves; oscule apical; texture firm; colour, in spirit,

x, 5.

yellowish-green; skeleton of radially-arranged oxea, anatriænes, and protriænes of two sizes, with small oxea scattered regularly throughout choanosome; microscleres sigmaspiræ.

Spicules:

- (1) oxea, 2.0 by 0.032 mm.,
- (2) oxea, 0.6–0.8 by 0.02–0.034 mm.,
- (3) anatriænes, cladi 0.035 mm. chord, rhabdome 1.1–2.0 by 0.004–0.007 mm.
- (4) protriænes, rarely prodiænes, cladi 0.07 mm. long, rhabdome 2.0 by 0.007 mm.,
- (5) protriænes, cladi 0.05 mm. long, rhabdome 1.1 by 0.004 mm.,
- (6) sigmaspiræ 0.012–0.014 mm. chord.

REMARKS.—The species finds its nearest relative in *T. monodi* Burton from West Africa.

Genus *Chrotella* Sollas.

*Chrotella* Sollas, 1886 : 180; *Cinochyra* Sollas, 1886 : 182; *Cinachyra* Sollas 1887 : 20; *Cinachyra* Sollas, 1888 : cxxv; *Spiretta* Lendenfeld, 1888 : 42; *Cinachyrella* Wilson, 1925 : 356.

*Chrotella cavernosa* (Lamarck).

*Tethya cavernosa* Lamarck, 1815 : 70; Lamarck, 1816 : 385; Topsent, 1930 : 5, pl. ii, figs. 9–10.

(For synonymy and literature see Burton, 1934 : 523, under *Cinachyra australiensis*.)

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E. to 11° 56' 42" N., 50° 39' 12" E.), 37 m., bottom sand and shells; Stn. 43, October 28, 1933, South Arabian Coast (17° 29' 00" N., 55° 47' 00" E.), 95 m.

DISTRIBUTION.—Red Sea and Indian Ocean generally; East Indies; Australia; littoral to 91 m.

*Chrotella eurystoma* (Keller).

*Cinachyra eurystoma* Keller, 1891 : 338, pl. xix, figs. 46–48; *Tetilla barodensis* Dendy, 1916 : 105, pl. i, fig. 3.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53' 42" N., 51° 13' 12" E.), 73–220 m., bottom coarse sand and shell; Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Red Sea; Indian Ocean (Okhamandal); 27–31 m.

Genus *Paratetilla* Dendy.

*Paratetilla bacca* (Selenka).

*Stelletta bacca* Selenka, 1867 : 569, pl. xxxv, figs. 14, 15; *Tethya merguiensis* Carter, 1883 : 366, pl. xv, figs. 6–8; Carter, 1887 : 80; *Tetilla merguiensis* Sollas, 1888 : 14; *T. ternatensis* Kieschnick, 1896 : 527; *T. merguiensis* Topsent, 1897 : 437, pl. xviii, figs. 4–5, pl. xxi, fig. 34; *T. bacca* Lindgren, 1897 : 485; Lindgren 1898 : 46; *T. amboinensis* Kieschnick, 1898 : 10; *T. violacea* Kieschnick, 1898 : 15; *T. rubra* Kieschnick, 1898 : 18; *T. amboinensis* Kieschnick, 1900 : 556, pl. xlv, figs. 1–7; *T. violacea* Kieschnick, 1900 : 559, pl. xlv, figs. 8–15; *T. rubra* Kieschnick, 1900 : 560, pl. xlv, figs. 23–29; *T. bacca* Thiele, 1900 : 39, pl. ii, fig. 13; Kirkpatrick, 1900 : 132; Lendenfeld, 1903 : 19; *Cinachyra amboinensis* Lendenfeld, 1903 : 26; Kirkpatrick, 1905 : 665; *Paratetilla cineriformis* Dendy, 1905 : 97, pl. iii, fig. 7; *P. eccentrica* Row, 1911 : 306, pl. xxxv, fig. 1, pl. xxxvi, fig. 8, text-figs. 5–7; *Cinachyra amboinensis* Hentschel, 1912 : 331; *P. bacca* Dendy, 1921 : 21; *P. bacca*, var. *violacea* Dendy, 1921 : 22, pl. i, fig. 6; *P. bacca*, var. *corrugata* Dendy, 1921 : 23, pl. i, fig. 7; *P. arcifera* Wilson, 1925 : 381, pl. xl, fig. 2, pl. xlviii, fig. 6.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

REMARKS.—The single specimen, 50 mm. across, differs from most recorded specimens of this species in that the rhabdome of the orthotriænes, in this case measuring up to 0.9 by 0.048 mm., is consistently longer than the cladi, which do not exceed 0.64 mm. in length. Otherwise, the spiculation is typical except for the presence of abundant raphides, 0.3 mm. long, distributed in bundles throughout the choanosome. These correspond, evidently, to the "short, slender oxea, 0.3 by 0.002 mm." mentioned by Dendy (1921, p. 24) for his *P. bacca*, var. *corrugata*. I have re-examined all the material of *P. bacca* in the British Museum collection and find that in most of Dendy's (1921) specimens these raphides are present but scattered, and that in the other specimens (identified by Row, Kirkpatrick, Dendy, Sollas and Carter) they may be absent, sparingly present or abundant. The present specimen is, however, the first one I have seen to carry these spicules in dragmata.

DISTRIBUTION.—Red Sea; Indian Ocean (Ceylon, Praslin Reef, Coevity, Egmont Reef, Salomon, Diego Garcia, Christmas Island); Indo-Pacific (Mergui Archipelago, Java, Amboina, Torres Straits, Philippines, Samoa); 8–18 m.

Genus *Fangophilina* Schmidt.

*Fangophilina submersa* Schmidt.

*Fangophilina submersa* Schmidt, 1880 : 73, pl. ix, fig. 3; Sollas, 1888 : 55; *Spongocardium gilchristi* Kirkpatrick, 1902 : 224, pl. ii, fig. 1, pl. iii, fig. 1; *Fangophilina submersa* Kirkpatrick, 1905 : 666; *F. gilchristi* Kirkpatrick, 1905 : 666; *F. hirsuta* Lendenfeld, 1906 : 157, pl. x, figs. 11–29, pl. xi, figs. 1–6, pl. xii, figs. 1–14; *F. kirkpatricki* Lendenfeld, 1906 : 169, pl. x, figs. 14–17; *F. submersa* Topsent, 1923 : 2.

OCCURRENCE.—Stn. 106, January 12, 1934, Zanzibar Area ( $5^{\circ} 38' 54''$  S.,  $39^{\circ} 15' 42''$  E. to  $5^{\circ} 40' 18''$  S.,  $39^{\circ} 17' 36''$  E.), 212 m., bottom green mud.

REMARKS.—Ten specimens only have hitherto been recorded, from widely-separated localities, under three different specific names. Topsent's (1923) suggestion that all represent varieties of a single species is supported by my own observations on a further group of specimens from a single locality off the South African coast. In these the differences between the supposed species could be seen.

DISTRIBUTION.—Caribbean Sea; Cape Verde Is.; Natal; Dar-es-Salaam; 217–400 m.

*Acanthotetilla* gen. n.

GENOTYPE.—*Acanthotetilla hemisphærica* sp. n.

DIAGNOSIS.—Tetillidæ with radially-arranged surface brushes of long oxea and protriænes; with the choanosome densely filled with stout acanthoxea; sigmaspiræ absent.

*Acanthotetilla hemisphærica* sp. n.

(Text-fig. 5.)

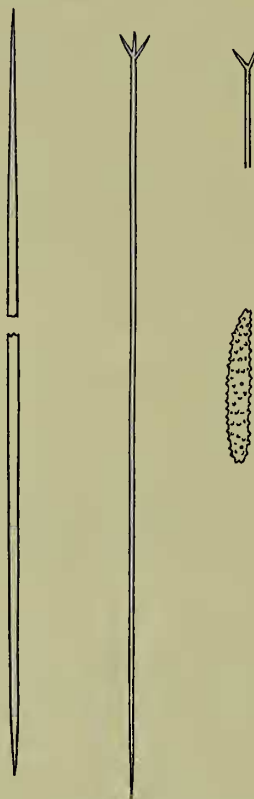
HOLOTYPE.—B.M. 1936.3.4.530.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge massive, hemispherical; surface strongly pilose; oscules not apparent; texture firm, almost stony; colour, in spirit, pale flesh; skeleton of densely-

packed acanthoxea with oxea and protriænes projecting at surface; megascleres oxea, 4.0 by 0.032 mm., protriænes, occasionally prodiænes, cladi 0.056 m. long, shaft 2.0 by 0.014 mm., and acanthoxea, 0.4 by 0.06 mm.; microscleres absent.

REMARKS.—Externally this sponge has the appearance of a normal Tetillid, but the presence of acanthoxea in association with oxea and protriænes is most remarkable. It is possible that the acanthoxea represent, more properly, microscleres derived from the sigmaspiræ characteristic of the Tetillidæ.



TEXT-FIG. 5.—*Acanthotetilla hemisphærica* sp. n. Oxeote, protriæne, head of prodiæne, acanthoxeote, all  $\times 50$ .

Numerous embryos are present, of two kinds. The first is oval, 0.16 mm. along the long axis and composed of large granular cells. The larger are nearly spherical, 0.55 mm. diameter, heavily pigmented a rich amber so that their structure is not obvious.

Family CLAVULIDÆ.

Genus *Suberites* Nardo.

*Suberites domuncula* (Olivi).

*Alcyonium domuncula* Olivi, 1792 : 241 ; *Suberites domuncula* Topsent, 1900 : 225, pl. vi, figs. 1-9.

(For synonymy see Burton, 1953.)

OCCURRENCE.—Stn. 175, May 1, 1934, Gulf of Aden ( $12^{\circ} 37' 24''$  N.,  $51^{\circ} 21' 12''$  E. to  $12^{\circ} 43' 18''$  N.,  $51^{\circ} 19' 12''$  E.), 1618 m., bottom green mud.

REMARKS.—This is the first record for the Indian Ocean area, and it may represent a distribution through the Suez Canal from the Mediterranean.

DISTRIBUTION.—Throughout the Northern Hemisphere.

*Suberites ramulosus* Ridley and Dendy.

*Suberites ramulosus* Ridley and Dendy, 1886 : 487 ; *S. ramulosa*, var. *cylindrifera* Ridley and Dendy, 1886 : 487 ; *S. ramulosus* Ridley and Dendy, 1887 : 207 ; *S. ramulosus*, var. *cylindrifera* Ridley and Dendy, 1887 : 208, pl. xxix, fig. 5, pl. xliii, figs. 13-14.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29' 00" N., 55° 47' 00" E.), 95 m. ; Stn. 54, November 3, 1933, South Arabian Coast (21° 50' 00" N., 59° 52' 00" E.), 1046 m., bottom green mud ; Stn. 157, April 6, 1934, Maldive Area (4° 43' 48" N., 72° 55' 24" E. to 4° 44' 00" N., 72° 54' 18" E.), 229 m., bottom coral rock.

DISTRIBUTION.—Philippines ; 174-1280 m.

*Suberites kelleri* Burton.

*Suberites incrustans* Keller, 1891 : 318, pl. xvii, figs. 19-20 ; *S. kelleri* Burton, 1930 : 536 ; *nec S. incrustans*, Hansen.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53' 42" N., 51° 13' 12" E.), 73-220 m., bottom coarse sand, shells and (?) rock.

DISTRIBUTION.—Red Sea.

Genus *Pseudosuberites* Topsent.

*Pseudosuberites hyalinus* (Ridley and Dendy).

*Hymeniacion ? hyalinus* Ridley and Dendy, 1887 : 168, pl. xlv, fig. 6 ; *Pseudosuberites hyalinus* Topsent, 1898 : 103 ; Topsent, 1900 : 170, pl. ii, fig. 9 ; Topsent, 1913 : 26, pl. iii, fig. 10 ; Kirkpatrick, 1908 : 21, pl. xxvi, fig. 7 ; Row 1911 : 305 ; Hentschel, 1914 : 52 ; *P. hyalinus*, var. *compacta* Hentschel, 1914 : 53, pl. iv, fig. 1 ; Topsent, 1917 : 37 ; *Pseudosuberites hyalinus* Burton, 1929 : 445.

OCCURRENCE.—Stn. 194, May 7, 1934, Gulf of Aden (13° 16' 00" N., 46° 20' 24" E. to 13° 16' 36" N., 46° 14' 00" E.), 220 m.

REMARKS.—This species, most commonly recorded from the Antarctic, has also been found off Norway, in the Mediterranean and at Suez. It is here recorded for the Gulf of Aden.

DISTRIBUTION.—Between Norway and Bear Island ; Banyuls ; Suez ; south-west coast of Patagonia ; Antarctic ; 40-456 m.

Genus *Laxosuberites* Topsent.

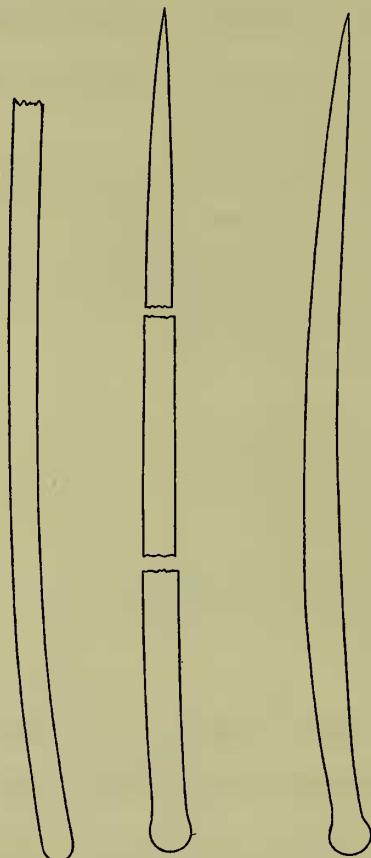
*Laxosuberites longispiculus* sp. n.

(Text-fig. 6.)

HOLOTYPE.—B.M. 1936.3.4.339.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area (4° 43' 48" N., 72° 55' 24" E. to 4° 44' 00" N., 72° 54' 18" E.), 229 m., bottom coral rock.

DIAGNOSIS.—Sponge a small incrustation on a piece of rock ; oscules not apparent ; texture soft ; colour, in spirit, white ; skeleton of tylostyli, rarely styli, of two sizes, 0.56–0.8 by 0.024 and 1.8–2.4 by 0.014–0.024 mm. respectively, with numerous intermediates, echinating on substratum ; microscleres absent.



TEXT-FIG. 6.—*Laxosuberites longispiculus* sp. n. Style and tylostyli,  $\times 200$ .

Genus *Tentorium* Vosmaer.

*Tentorium semisuberites* (Schmidt).

*Thecophora semisuberites* Schmidt, 1870 : 50, pl. vi, fig. 2 ; *T. ibla* Thomson, 1873 : 148, fig. 24 ; *T. semisuberites* Whiteaves, 1874 : 9 ; *T. ibla* Verrill, 1874 : 500, pl. viii ; *T. elongata* Marenzeller, 1877 : 12, pl. ii, fig. 4 ; *T. semisuberites* Vosmaer, 1882 : 30 ; Vosmaer, 1885 : 18, pl. i, figs. 23–24, pl. iii, figs. 22–26 ; *Tentorium semisuberites* Ridley and Dendy, 1886 : 489 ; Ridley and Dendy, 1887 : 221 ; Vosmaer, 1887 : 329, pl. ii, fig. 4, pl. xxi, fig. 19 ; *Thecophora semisuberites* Fristedt, 1887 : 433 ; *Tentorium semisuberites* Topsent, 1892 : 132 ; Lambe, 1896 : 198, pl. iii, fig. 2 ; Lambe, 1900 : 25 ; Lambe, 1900 : 163 ; Topsent, 1904 : 124 ; Arndt, 1912 : 113 ; Topsent, 1913 : 25 ; Ferrer, 1914 : 19 ; Pawsey and Davis, 1924 : 14 ; Topsent, 1928 : 151 ; pl. vi, fig. 10 ; Rezvoj, 1928 : 81 ; Hentschel, 1929 : 924 ; Burton, 1932 : 337.

OCCURRENCE.—Stn. 108, January 13, 1934, Zanzibar Area ( $5^{\circ} 18' 06''$  S.,  $39^{\circ} 24' 12''$  E. to  $5^{\circ} 14' 30''$  S.,  $39^{\circ} 25' 36''$  E.), 781 m., bottom grey mud.

DISTRIBUTION.—Arctic Ocean between Canada and Barents Sea ; Western North Atlantic (Nova Scotia, Gulf of St. Lawrence, north-east coast of U.S.A.) ; Eastern North

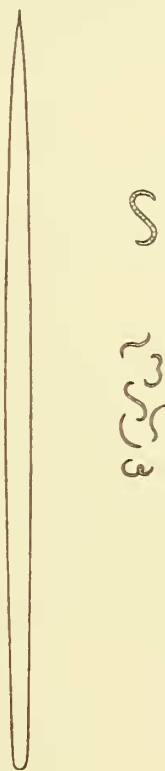
Atlantic (Norway, Shetlands, Lousy Bank, coast of Asturias); Azores; Inaccessible Is.; Tristan da Cunha; 37-3018 m., bottom mud, muddy sand, gravel, rarely rocky.

*Tentorina* gen. n.

GENOTYPE.—*Tentorina sigmatophora* sp. n.

DIAGNOSIS.—Clavulidæ with skeleton of strongyloxea, sparsely present in choanosome and forming a continuous tangential layer in ectosome; microscleres sigmaspiræ.

REMARKS.—The external form of the genotype and also the structure of the skeleton recall those of the genus *Tentorium*. On the other hand, the megascleres are typical of the genus *Tethya* and the microscleres of *Tetilla*.



TEXT-FIG. 7.—*Tentorina sigmatophora* sp. n. Strongyloxeote,  $\times 200$ , sigmaspiræ,  $\times 500$  (single sigmaspira, above,  $\times 750$ ).

*Tentorina sigmatophora* sp. n.

(Text-fig. 7.)

HOLOTYPE.—B.M. 1936.3.4.516.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DIAGNOSIS.—Sponge small, conical; surface even, smooth; oscules apical (?); texture soft, delicate; colour, in spirit, pale yellow; megascleres strongyloxea, 0.45-0.6 by 0.01-0.02 mm.; microscleres sigmaspiræ, 0.012 mm. chord.

Genus *Polymastia* Bowerbank.*Polymastia tubulifera* Dendy.*Polymastia tubulifera* Dendy, 1921 : 148, pl. iv, fig. 6, pl. xviii, fig. 7.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

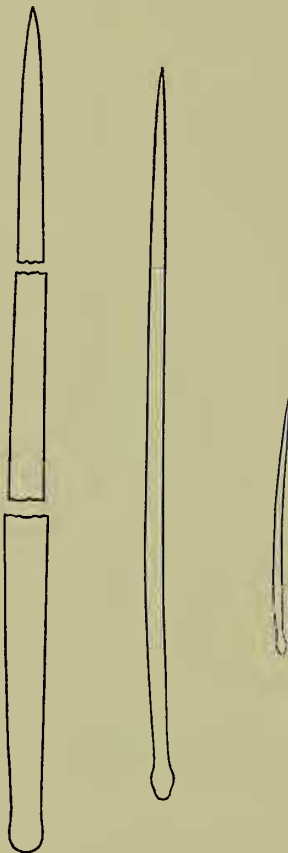
DISTRIBUTION.—Indian Ocean (Saya de Malha) ; 90 m.

*Polymastia murrayi* sp. n.

(Text-fig. 8.)

HOLOTYPE.—B.M. 1936.3.4.305.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area (4° 43' 48" N., 72° 55' 24" E. to 4° 44' 00" N., 72° 54' 18" E.), 229 m., bottom coral rock ; Stn. 177, May 2, 1934, Gulf of

TEXT-FIG. 8.—*Polymastia murrayi* sp. n. Tylostyli, of three sizes,  $\times 200$ .

Aden (12° 01' 54" N., 50° 39' 12" E.), 366 m., bottom green mud and rock ; Stn. 185, May 5, 1934, Gulf of Aden (13° 48' 06" N., 49° 16' 48" E. to 13° 48' 36" N., 49° 16' 24" E.), 2001 m., bottom green mud.

DIAGNOSIS.—Sponge subspherical (?), with a stout fleshy papilla ; surface hispid, except on papilla ; oscule small, apical on papilla ; texture firm ; colour, in spirit, greyish ; skeleton of stout radiating bundles of tylostyli, with a subectosomal, tangential layer medium-sized tylostyli and a dermal palisade of small tylostyli.



## Spicules :

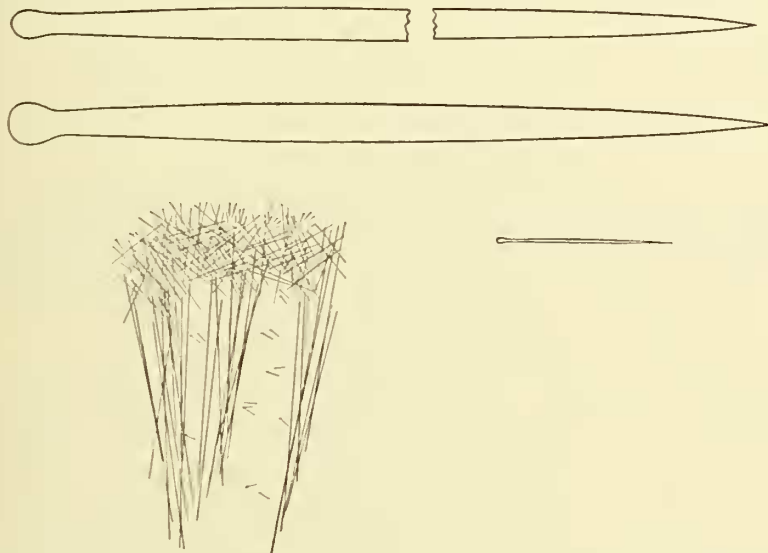
- large tylostyli, 1.8 by 0.028 mm.,  
 medium-sized tylostyli, 0.48 by 0.014 mm.,  
 small tylostyli, 0.14–0.17 by 0.006 mm.,

SYSTEMATIC NOTES.—There is only a fragment of this sponge, including the papilla, and the interior is sufficiently cleaned of flesh to leave doubt as to the presence or absence of small tylostyli in the choanosome.

Three small specimens must also be included in this species. They are subspherical, somewhat flattened dorso-ventrally, 10–20 mm. diameter. The spicules do not differ much in size from those of the holotype. On the other hand, the tangential subectosomal layer of tylostyli is more diffuse, and the radial bundles not so strongly marked. This may be due to the immature state of the specimens. In all three, both small and medium-sized tylostyli are abundantly scattered between the radial bundles of large tylostyli.

The characteristic feature of the species appears to be the single fleshy papilla, which is short and stout, and is surrounded by an area relatively less hispid, than the general surface of the sponge.

Although the bases of the large tylostyli of the holotype, of the specimen from Stn. 157, and one of those from Stn. 185 are all of the same shape, in the second specimen from Stn. 185 the large megascleres vary from styli to tylostyli, although in the latter the shape of the base is often typical for the species.



TEXT-FIG. 9.—*Polymastia clavata* sp. n. Tylostyli, of three sizes,  $\times 200$ ; section at right angles to surface,  $\times 10$ .

*Polymastia clavata* sp. n.

(Text-fig. 9.)

HOLOTYPE.—B.M. 1936.3.4.497.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shells and (?) rock.

DIAGNOSIS.—Sponge stipitate, with body irregularly rounded and bearing short, blind papillæ; surface even, hispid; oscules not apparent; texture firm; colour, in spirit, pale yellowish-grey; skeleton of slender radial bundles of long tylostyli, with a cortical layer of shorter tylostyli irregularly and densely arranged, and an ectosomal palisade of small, hair-like tylostyli; megascleres tylostyli, of the radial bundles, 1.2 by 0.02 mm., tylostyli of the cortical layer, 0.24–0.8 by 0.012–0.036 mm., and tylostyli of the ectosomal palisade, 0.12 by 0.003 mm.

REMARKS.—The species differs from all known species in its external form, as well as in details of its spiculation, particularly in the hair-like shape of the smallest tylostyli.

#### Genus *Radiella* Schmidt.

##### *Radiella sarsii* (Ridley and Dendy).

*Trichostemma sarsii* Ridley and Dendy, 1886 : 488; Ridley and Dendy, 1887 : 218, pl. xliii, figs. 1–3; *T. sarsii* Topsent, 1892 : 132; 1904, p. 120; *T. sarsii* Dendy, 1921 : 151; *T. sarsii*, Topsent 1928 : 154.

OCCURRENCE.—Stn. 108, January 13, 1934, Zanzibar Area (5° 18' 06" S., 39° 24' 12" E. to 5° 14' 30" S., 39° 25' 36" E.), 781 m., bottom grey mud; Stn. 145 E, April 2, 1934, Maldive Area (4° 58' 42" S., 73° 16' 24" E.), 494 m., bottom green mud and sand.

REMARKS.—The 18 specimens from Stn. 108 and the 12 specimens from Stn. 145 agree closely with the "Challenger" specimens (Stn. 73). They range in diameter from 9 to 22 mm.

DISTRIBUTION.—Azores (861–2102 m.); Madeira (1477–2380 m.); Morocco (851 m.); Saya de Malha, Indian Ocean (5(?)–914 m.); Australia, off Queensland (1829 m.).

#### Genus *Spirastrella* Schmidt.

##### *Spirastrella cuspidifera* (Lamarck).

*Alcyonium cuspidiferum* Lamarck, 1813 : 168; Lamarck, 1816 : 401; *Suberites capensis* Carter, 1882 : 350; *Spirastrella cunctatrix* var., Carter, 1882 : 351; *Suberites* sp., Carter, 1882 : 352; *Spirastrella vagabunda* Ridley, 1884 : 468, pl. xliii, fig. e; *S. vagabunda*, var. *trincomaliensis* Ridley, 1884 : 468; *S. congenera* Ridley, 1884 : 469, pl. xliii, fig. d; *S. punctulata* Ridley, 1884 : 623, pl. liv, fig. p; *Suberites capensis* Carter, 1886 : 114; *Spirastrella solida* Ridley and Dendy, 1886 : 491; 1887 : 231, pl. xli, fig. 7, pl. xlv, fig. 13; *S. trincomaliensis* Carter, 1887 : 74, pl. vi, figs. 7–8; *Suberites inconstans* Dendy, 1887 : 154; *S. inconstans*, var. *globosa* Dendy, 1887 : 155, pl. ix, fig. 1; *S. inconstans* var. *mæandrina* Dendy, 1887 : 155, pl. x, fig. 1; *S. inconstans*, var. *digitata* Dendy, 1887 : 155, pl. ix, fig. 2; ? *Papillina panis* (pars) Lendenfeld, 1888 : 58; *Suberites mastoideus* Keller, 1891 : 317, pl. xvii, figs. 16–18; *Spirastrella punctulata*, Topsent, 1893 : 177, fig. 4; *S. vagabunda*, var. *arabica* Topsent, 1893 : 177, fig. 1; *S. cylindrica* Kieschnick, 1896 : 534; *S. solida* Topsent, 1897 : 440; *S. carnosa* Topsent, 1897 : 441; *S. papillosa*, var. *porosa* Dendy, 1897 : 253; *Vioa florida* Lendenfeld, 1897 : 108, pl. x, figs. 78–105; *Spirastrella solida* Lindgren, 1897 : 484; 1898 : 43; *S. lacunosa* Kieschnick, 1898 : 45; *S. spiculifera* Kieschnick, 1898 : 45; *Spirastrella inconstans* Thiele, 1899 : 10, pl. i, fig. 3, pl. v, fig. 4; *S. cylindrica* Thiele, 1900 : 69, pl. iii, fig. 23; *S. lacunosa* Kieschnick, 1900 : 575; *S. spiculifera* Kieschnick, 1900 : 575; *S. carnosa* Kirkpatrick, 1900 : 128; *S. inconstans* Sollas, 1902 : 216, pl. xiv, fig. 3; *S. lacunosa* Dragnewitsch, 1905 : 13; *S. vagabunda* Dendy, 1905 : 122; *S. vagabunda*, var. *trincomaliensis* Dendy, 1905 : 123; *S. vagabunda*, var. *tubulodigitata* Dendy, 1905 : 123; *S. vagabunda*, var. *fungoides* Dendy, 1905 : 124; *S. vagabunda*, var. *gallensis* Dendy, 1905 : 124; *S. tentorioides* Dendy, 1905 : 125, pl. v, fig. 7; *S. cunctatrix* Hentschel, 1909 : 382; *S. tentorioides*, var. *australis* Hentschel, 1909 : 383; *S. digitata* Hentschel, 1909 : 385, pl. xxii, fig. 7, text-fig. 18; *Suberites capensis* Vosmaer, 1911 : 12; *Spirastrella congenera* Vosmaer, 1911 : 12; *S. punctulata* Vosmaer, 1911 : 14; *S. vagabunda* Vosmaer, 1911 : 14, pl. xi, fig. 5; *Suberites inconstans* Vosmaer, 1911 : 18; *S. trincomaliensis* Vosmaer, 1911 : 20; *Spirastrella cylindrica* Vosmaer,

1911 : 21 ; *S. carnosa* Vosmaer, 1911 : 22 ; *Vioa florida* Vosmaer, 1911 : 23 ; *Spirastrella tentorioides* Vosmaer, 1911 : 24 ; *S. digitata* Vosmaer, 1911 : 25 ; *S. purpurea* (pars), Vosmaer, 1911 : 6, pl. i, figs. 1-9, pl. ii, figs. 1, 3-4, 6, pl. iii, figs. 1-2, pl. iv, figs. 1-9, pl. v, figs. 1-23, pl. vi, figs. 1-12, pl. vii, figs. 1-6, pl. viii, figs. 2-3, 5-6, pl. ix, figs. 1-9, pl. xi, fig. 2, pl. xii, figs. 10, 12, pl. xiii, fig. 4, pl. xiv, figs. 2-4 ; *S. purpurea* Hentschel, 1912 : 324 ; *S. montiformis* Hallmann, 1912 : 119, pl. xxi, fig. 3, text-fig. 21 ; ? *Papillina panis* (pars), Hallmann, 1914 : 294 ; *Spirastrella vagabunda*, var. *arabica* Topsent, 1918 : 550, fig. x ; *S. punctulata* Topsent, 1918 : 551, fig. xi ; *S. solida* Topsent, 1918 : 551, fig. xii ; *S. carnosa* Topsent, 1918 : 551, fig. xiii ; *S. vagabunda* Dendy, 1921 : 139 ; *S. globularis* Dendy, 1921 : 141, pl. iv, fig. 5, pl. xviii, fig. 18 ; *S. vagabunda* Dendy and Frederick, 1924 : 508 ; Wilson 1925 : 343 ; *S. cuspidifera* Topsent, 1933 : 41, pl. ii, fig. 4, text-fig. 4 ; *S. inconstans* Burton, 1934 : 570 ; *Cliona arndtii* de Laubenfels, 1936 : 152.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shell and Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), depth uncertain, 73-165 m.

DIAGNOSIS.—Sponge typically digitate or composed of a bunch of stout, erect, digitate processes springing from a basal mass, often fungiform, or massive with submeandrine surface, occasionally boring ; surface minutely hispid, even or thrown into meandrine folds, plentifully beset with commensal cirripedes ; oscules scattered in massive forms, at summit of processes in digitate forms ; texture hard, incompressible ; colour, in life, orange or brick-red, in spirit, yellow to brown ; skeleton a coarse isodictyal, multispicular reticulation of tylostyli, 0.6 by 0.022 mm. ; microscleres slender spinispiræ, beset with wart-like processes, 0.006-0.048 mm., or even 0.07 mm. long, and stout spinispiræ, 0.05-0.06 mm. long.

DISTRIBUTION.—Red Sea and Gulf of Aden ; Indian Ocean (Ceylon, Madras, Diego Garcia, Seychelles, Amirante, Egmont, Salomon, Coin Peros, Cargado Carajos, Mauritius) ; Zanzibar ; Mozambique ; Port Elizabeth ; Malay Area (Mergui Archipelago, Pulau Bidang, Singapore, Java, Xmas Is., Celebes, Ternate, Amboina, Aru and Kei Islands, Philippines) ; Australia (Torres Straits, Great Barrier Reef, Queensland, Port Jackson, Port Phillip Heads, Abrolhos Is., Sharks Bay) ; littoral to 59 m., bottom sand, rock, mud, shells and, above all, coral.

*Spirastrella spinispirulifer* (Carter).

*Suberites spinispirulifer* Carter, 1879 : 345, pl. xxviii, figs. 6-7 ; Carter 1886 : 456 ; *Spirastrella dilatata* Kieschnick, 1896 : 534 ; *S. spinispirulifer* Dendy, 1897 : 251 ; *S. dilatata* Thiele, 1900 : 70, pl. ii, fig. 22.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73-165 m., bottom rock(?).

DISTRIBUTION.—South Africa (Port Elizabeth) ; Australia (Port Western, Port Phillip) ; Ternate.

Genus *Diplastrella* Topsent.

*Diplastrella gardineri* Topsent.

*Diplastrella gardineri* Topsent, 1918 : 549, fig. viii.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73-165 m. ; Stn. 177, May 2, 1934, Gulf of Aden (12° 01' 54" N., 50° 39' 12" E.), 366 m., bottom green mud and rock.

REMARKS.—The dimensions of the spicules, which were not given by Topsent, are : tylostyli, 0.44 by 0.012 mm., diplasters, 0.012–0.02 mm. across, and amphiasters (? young diplasters), 0.008 mm. across.

DISTRIBUTION.—Maldives, 42 m.

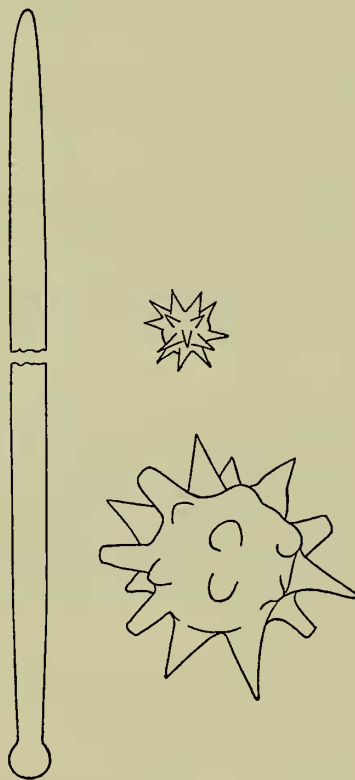
Genus *Timea* Gray.

*Timea capitatostellifera* (Carter).

*Hymedesmia capitatostellifera* Carter, 1880 : 51, pl. iv, fig. 12.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73–165 m., bottom rock (?).

DISTRIBUTION.—Gulf of Manaar.



TEXT-FIG. 10.—*Timea tethyoides* sp. n. Tylostyle,  $\times 200$ , and two sizes of spherasters,  $\times 500$ .

*Timea tethyoides* sp. n.

(Text-fig. 10.)

HOLOTYPE.—B.M. 1936.3.4.304.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04' 57" N., 39° 13' 18" E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge encrusting; surface uneven, hispid; oscules not apparent; texture soft; colour, in spirit, light greyish-brown; skeleton of tylostyli, 0.4–0.8 by 0.022 mm., arranged in divergent brushes arising from substratum, with small tylostyli near surface; microscleres choanosomal spherasters, with conical rays, rounded distally in

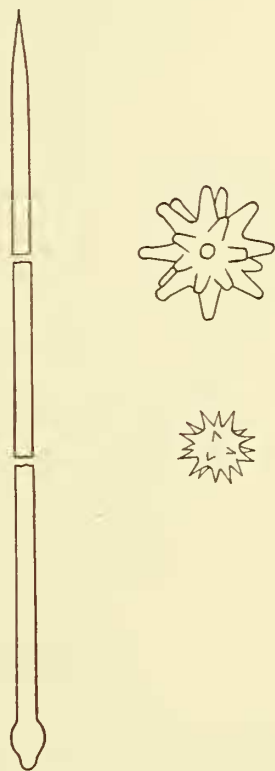
early stages of development, later much-branched, 0.08 mm. diameter, and ectosomal spherasters, with rays conical and obtusely pointed, 0.02 mm. diameter.

*Timea sphastræa* sp. n.

(Text-fig. 11.)

HOLOTYPE.—B.M. 1936.3.4.303.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  N.,  $39^{\circ} 14' 12''$  E.), (depth ?).



TEXT-FIG. 11.—*Timea sphastræa* sp. n. Tylostyle,  $\times 200$ , and spherasters,  $\times 500$ .

DIAGNOSIS.—Sponge encrusting; surface uneven, hispid in patches; oscules not apparent; texture soft; colour, in spirit, greyish; skeleton of sparsely distributed tylostyli, 1.1 by 0.012 mm.; microscleres spherasters, smaller with pointed, larger with conical obtusely-pointed rays, 0.02–0.035 mm. diameter.

Genus *Trachycladus* Carter.

*Trachycladus tethyoides* sp. n.

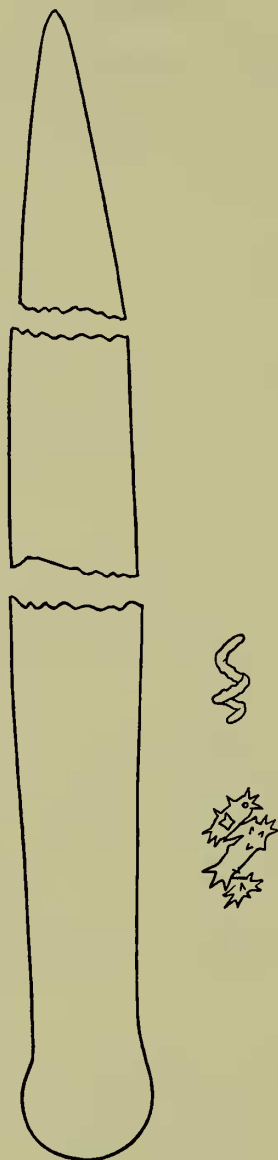
(Text-fig. 12.)

HOLOTYPE.—B.M. 1936.3.4.576.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shingle and (?) rock.

DIAGNOSIS.—Sponge subspherical, surface minutely and irregularly papillate, strongly hispid; oscules not apparent; texture firm, barely compressible; colour, in spirit, pale yellow; skeleton of loose radial strands of tylostyli, variable in size but averaging 2.0 by 0.09 mm.; microscleres spinispiræ, passing rarely to microstrongyla, 0.03 mm. chord.

REMARKS.—The species differs from all others in external form, and in the presence of tylostyli for megascleres.



TEXT-FIG. 12.—*Trachycladus tethyoides* sp. n. Tylostyle,  $\times 300$ , sigmaspiræ,  $\times 500$ .

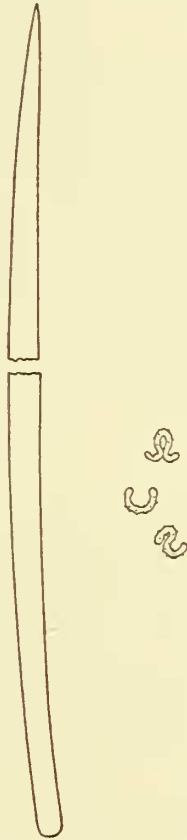
The only other feature worthy of note is that each of the three specimens recorded here bears on its surface an incrustation of *Biemna fortis* (Topsent), so thin that it is not immediately apparent even in sections. More obvious is the presence of numerous raphides scattered generally throughout the choanosome of the *Trachycladus* and appearing there as proper spicules. In fact, one could be led to believe, at first glance, that they belonged to the *Trachycladus*.

*Trachycladus cervicornis* sp. n.

(Text-fig. 13.)

HOLOTYPE.—B.M. 1936.3.4.610.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53' 42" N., 51° 13' 12" E.), 73–220 m., bottom coarse sand, shingle and (?) rock.

TEXT-FIG. 13.—*Trachycladus cervicornis* sp. n. Tylostyle,  $\times 200$ , sigmaspiræ,  $\times 500$ .

DIAGNOSIS.—Sponge erect, stipitate, dichotomously branched; surface minutely papillate, strongly hispid; oscules not apparent; texture firm, compressible; colour, in spirit, pale yellow; skeleton of long, smooth styli, 1.4 by 0.02 mm., arranged in a dense axial core, with single spicules projecting well beyond surface of sponge; microscleres spinispiræ, 0.008 mm. chord.

REMARKS.—This is a well marked species differing from other species of *Trachycladus* in external form and in the large size of the megascleres.

Genus *Placospongia* Gray.*Placospongia carinata* (Bowerbank).

*Geodia carinata* Bowerbank, 1858 : 308, 314, pl. xxv, fig. 19, pl. xxvi, fig. 10; Bowerbank 1864 : 254, pl. x, fig. 163; Bowerbank, 1874 : 298, pl. xlvi, figs. 1–5 Bowerbank, 1875 : 295; *Placospongia carinata* Ridley, 1884 : 376, 481; Sollas, 1888 : 272; *P. intermedia* Sollas, 1888 : 273; *P. carinata* Lindgren, 1897 : 485; Lindgren, 1898 : 45, pl. xviii, fig. 26; *P. mixta* Thiele, 1900 : 72, pl. iii, fig. 25; *P. carinata*

Vosmaer and Vernhout, 1902 : 9, pl. i, figs. 1-4, pl. ii, fig. 5, pl. iv, figs. 9-13, pl. v, figs. 1, 5, 7-9, 11; Dendy, 1905 : 126 ; Hentschel, 1912 : 324 ; Dendy, 1921 : 144.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Indian Ocean (Ceylon, Cargados Carajos, Egmont, Coevity) ; Straits of Malacca, Java, Ternate ; Torres Straits ; 13-55 m., bottom sand.

Family ASTRAXINELLIDÆ.

Genus *Hemiasterella* Carter.

*Hemiasterella typus* Carter.

*Hemiasterella typus* Carter, 1879 : 146, pl. xxi, fig. 9 ; Sollas, 1888 : 434 ; Topsent, 1919 : 6.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E. to 11° 56' 42" N., 50° 39' 12" E.), 37 m., bottom sand and shells.

REMARKS.—The single specimen is vasiform and stipitate, 160 mm. high and 140 mm. across. The microscleres, up to 0.05 mm. diameter, may have smooth pointed rays or strongylote and microspined rays.

DISTRIBUTION.—(Hitherto unknown.)

*Hemiasterella complicata* Topsent.

*Hemiasterella complicata* Topsent, 1919 : 7, figs. 2-5.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53' 42" N., 51° 13' 12" E.), 73-220 m., bottom coarse sand and shingle.

REMARKS.—A typical specimen, vasiform and stipitate, 45 mm. high.

DISTRIBUTION.—Madagascar.

Family TETHYADÆ.

Genus *Tethya* Lamarck.

*Tethya* Lamarck, 1815 : 69 ; *Tethia* Lamarck, 1816 : 384 ; *Thethya* Cuvier, 1817 : 250 ; *Jethya* Rafinesque, 1820 : 364 ; *Donatia* Nardo, 1833 : 522 ; *Lyncuria* Nardo, 1834 : col. 715 ; *Tethea* Siebold, 1843 : 363 ; *Tethyum* Lieberkühn, 1859 : 522 ; *Thetea* Schmidt, 1866 : 13 ; *Amniscos* Gray, 1867 : 542 ; *Columnitis* Schmidt, 1870 : 25 ; *Tethya* Studer, 1879 : 120 ; *Ichthya* Mereschkowsky, 1880 : 418 ; *Alemo* Wright, 1881 : 13 ; *Columnites* Lendenfeld, 1890 : 397 ; *Tethycordyla* de Laubenfels, 1934 : 8 ; *Tethytimea* de Laubenfels, 1936 : 164 ; *Taboga* de Laubenfels, 1936 : 452.  
(See also Burton, 1934 : 568.)

DIAGNOSIS.—Clavulidæ with main skeleton of radiating bundles of strongyloxea (styli or tylota) ; microscleres large cortical spherasters and various types of smaller asters scattered in cortex and choanosome.

REMARKS.—Only three names included in the present list of synonyms of *Tethya* call for comment. The type of *Taboga* (*T. taboga*) is clearly synonymous with *Tethya diploderma* Schmidt. *Tethycordyla* and *Tethytimea* are equally recognizable as representing *Tethya repens* Schmidt. *Tethycordyla* was established for a small stalked sponge, but it appears that, throughout its range, *Tethya repens* is almost invariably stalked.



De Laubenfels (1936, p. 164) agrees that the genotype of *Tethytimea* "probably should be called *repens*." He adds that "Schmidt's description (of *Tethya repens*), however, is very unsatisfactory and the synonymy is not certain." I have indicated (1924, p. 1036) in my revision of the genus *Donatia* that I had access to Schmidt's original material. Moreover, having re-examined this and compared it with the original description of the genotype of *Tethytimea*, my impression that *Tethya repens* Schmidt and *Tethytimea* (*Donatia*) *tylota* (Hentschel) are synonymous is fully confirmed.

*Tethya repens* Schmidt.

*Tethya repens* Schmidt, 1870 : 51 ; *Tethya repens* Sollas, 1888 : 439 ; *Donatia fissurata*, var. *extensa* Hentschel, 1909 : 374, pl. xxii, fig. 6, text-fig. 14 ; *D. tylota* Hentschel, 1912 : 317, pl. xvii, fig. 6 ; *D. stellagrandis* Dendy, 1916 : 266, pl. xlv, fig. 8, pl. xlvi, fig. 5 ; *Tethya repens* Topsent, 1918 : 574 ; *Donatia fissurata*, var. *extensa* Topsent, 1918 : 599 ; *D. tylota* Topsent, 1918 : 599 ; *Donatia stellagrandis* Topsent, 1918 : 600 ; *Donatia repens* Burton, 1924 : 1036 ; *Donatia repens* Dendy and Burton, 1926 : 247 ; *Tethycordyla thyris* de Laubenfels, 1934 : 8 ; *Tethytimea tylota* de Laubenfels, 1936 : 164.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock ; Stn. 112, January 15, 1934, Zanzibar Area (5° 04' 12" S., 39° 13' 18" E.), 113 m., bottom coral rock ; Stn. 152, April 4, 1934, Maldive Area (4° 49' 24" N., 72° 46' 30" E. to 4° 48' 42" N., 72° 40' 30" E.), 878 m., bottom green sand.

REMARKS.—The 18 specimens, from two widely separated areas, are all very alike and agree closely with Hentschel's *Donatia fissurata*, var. *extensa*. The spiculation also agrees closely with that of Hentschel's specimen, as well as the others represented in the synonymy list, except in the size of the large spherasters. In the specimens hitherto recorded, the spherasters have ranged in size from 0.08 to 0.25 mm. diameter. In the present collection the maxima for the spherasters are, for nearly two-thirds of the specimens, 0.4 mm. diameter, for another, 0.6 mm. diameter, and, for the occasional specimen, 0.5 mm. diameter.

At first sight it appeared probable that the present specimens represented a new species, but the very close agreement between them and the other specimens accepted under *Tethya repens*, in all respects but the maximal size of the spherasters, is against this. Moreover, since the present specimens were collected off the coasts of Arabia and off Zanzibar it is doubtful whether they represent a geographical variety, while the bathymetric range, 13.5–113 m., as compared with that of previously known specimens, 7–877 m., does not suggest an ecological variety. Further, the specimens from Stn. 45 alone show all maxima between approximately 0.35–0.6 mm. diameter in the spherasters.

It is of interest to record that in some specimens the cortex may contain mainly spherasters measuring 0.08–0.25 mm. diameter, with a few reaching a diameter of 0.4 or even 0.6 mm., and in others the cortex is almost entirely filled with spherasters of 0.3–0.6 mm. diameter with a few of the smaller sizes scattered between. It does seem therefore that we must accept a fairly wide range of variation in the sizes of the spherasters and in their relative abundance as normal for the species.

DISTRIBUTION.—SW. Australia ; Aru Island ; Indian Ocean (Amirante, Andamans) ; Florida and West Indies ; 7–877 m.

## Order LITHISTIDA.

Genus *Discodermia* Bocage.*Discodermia natalensis* Kirkpatrick.

*Discodermia natalensis* Kirkpatrick, 1903 : 172, pl. iv, figs. 2-3 ; Burton, 1929 : 5.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73-165 m., bottom rock (?).

DISTRIBUTION.—Natal ; 91-183 m.

*Discodermia emarginata* Dendy.

*Discodermia emarginata* Dendy, 1905 : 99, pl. iv, fig. 4 ; Wilson, 1925 : 455 ; *D. emarginata*, var. *lamellaris* Wilson, 1925 : 456, pl. xliii, fig. 5.

OCCURRENCE.—Stn. 123, January 22, 1934, Zanzibar Area ( $5^{\circ} 19' 00''$  S.,  $39^{\circ} 32' 30''$  E. to  $5^{\circ} 19' 12''$  S.,  $39^{\circ} 33' 30''$  E.), 256-366 m., bottom green sand, mud and rock.

DISTRIBUTION.—Ceylon ; Philippines ; 183 m.

Genus *Theonella* Gray.*Theonella lacerata* Lendenfeld.

*Theonella lacerata* Lendenfeld, 1906 : 347, pl. xlv, figs. 1-13, pl. xlv, figs. 1-7.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast ( $17^{\circ} 29' 00''$  N.,  $55^{\circ} 47' 00''$  E.), 95 m.

DISTRIBUTION.—Sumatra ; 371 m.

*Theonella discifera* Lendenfeld.

*Theonella discifera* Lendenfeld, 1906 : 351, pl. xliii, figs. 5-18.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73-165 m.

DISTRIBUTION.—West coast of Australia, 65 m.

*Theonella pulchrifolia* Dendy.

*Theonella pulchrifolia* Dendy, 1921 : 5, pl. ix, fig. 1.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldives Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

REMARKS.—The species is represented by a small, ear-shaped specimen, 5 mm. high, the spiculation of which agrees very closely with that of the holotype except that the microscleres are microstrongyla instead of microxea.

DISTRIBUTION.—Salomon ; 209-273 m.

Genus *Corallistes* Schmidt.*Corallistes bowerbanki* (Johnson).

*Dactylocalyx bowerbanki* Johnson, 1863 : 257 ; *D. masoni* Bowerbank, 1869 : 91, pl. vi, figs. 1-4 ; *D. bowerbanki* Bowerbank, 1869 : 94, pl. vi, figs. 5-8 ; *Corallistes typus* Schmidt, 1870 : 22, pl. iii, fig. 3 ; *Dactylocalyx bowerbanki* Carter, 1873 : 437 ; *D. masoni* Carter, 1873 : 437 ; *Corallistes bowerbanki* Carter, 1876 : 460 ; Zittel, 1878 : 103 ; *C. masoni* Zittel, 1878 : 103 ; *C. typus* Zittel, 1878 : 103 ; *C. typus* Sollas, 1888 : 301, pl. xxxiv, figs. 14-18a ; *C. masoni* Sollas, 1888 : 303, pl. xxxiv, figs. 1-13 ; *C. bowerbanki* Sollas, 1888 : 308 ; Topsent, 1892 : 51, pl. viii, fig. 2 ; *Coscinospongia masoni* Lendenfeld, 1903 : 136 ; *C. typus* Lendenfeld, 1903 : 136 ; *C. bowerbankii* Lendenfeld, 1903 : 137 ; *Corallistes typus* Burton, 1929 : 5.

OCCURRENCE.—Stn. 123, January 22, 1934, Zanzibar Area ( $5^{\circ} 19' 00''$  S.,  $39^{\circ} 32' 30''$  E. to  $5^{\circ} 39' 12''$  S.,  $39^{\circ} 33' 30''$  E.), 256-366 m., bottom green mud, sand and rock.

DISTRIBUTION.—Portugal, Azores, Madeira, Pernambuco, Florida, Natal ; 91-684 m.

Genus *Taprobane* Dendy.*Taprobane herdmani* Dendy.

*Taprobane herdmani* Dendy, 1905 : 103, pl. i, fig. 8, pl. iv, fig. 2 ; Dendy, 1921 : 7, pl. i, fig. 1.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Amirantes ; Gulf of Manaar ; 16-71 m.

Genus *Microscleroderma* Kirkpatrick.*Microscleroderma hirsutum* Kirkpatrick.

*Microscleroderma hirsutum* Kirkpatrick, 1903 : 173, pl. iv, fig. 1.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

REMARKS.—The specimens include a complex mass of calciculate individuals, 170 mm. across, and some fragments, all with typical spiculation.

DISTRIBUTION.—Natal ; 165 m.

## Sub-order SIGMATOSCLEROPHORA.

## Family HAPLOSCLERIDÆ.

Genus *Haliclona* Grant.*Haliclona camerata* (Ridley).

*Reniera camerata* Ridley, 1884 : 605, pl. liii, fig. H, pl. liv, fig. n ; Topsent, 1897 : 474 ; Dendy, 1921 : 31 ; *Haliclona camerata* Burton, 1934 : 531.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea ( $13^{\circ} 31' 00''$  N.,  $42^{\circ} 31' 00''$  E.), 55 m.

REMARKS.—A typical specimen 25 mm. across.

DISTRIBUTION.—Indian Ocean (Seychelles, Amirante, Salomon) ; Amboina ; Great Barrier Reef ; 4-31 m.

*Haliclona cribriformis* (Ridley).

*Reniera cribriformis* Ridley, 1884 : 606, pl. liii, fig. G, pl. liv, fig. o ; Topsent, 1897 : 475, pl. xviii, fig. 10 ; Dendy, 1921 : 31.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73–165 m., bottom rock (?).

DISTRIBUTION.—Seychelles ; Amboina ; 22–80 m., bottom coral.

*Haliclona flagellifer* (Ridley and Dendy).

*Gellius vagabundus*, var.  $\gamma$  Vosmaer, 1885 : 28, pl. v, figs. 37–38 ; *G. flagellifer* Ridley and Dendy, 1886 : 333 ; Ridley and Dendy, 1887 : 42, pl. xiii, figs. 5, 10 ; Lundbeck, 1902 : 71, pl. ii, fig. 9, pl. xiv, fig. 1 ; Stephens, 1921 : 5 ; Dendy, 1921 : 26 ; *G. vagabundus* Babić, 1921 : 3 ; Babić 1922 : 228, fig. H ; *G. flagellifer* Dendy, 1924 : 320 ; Rezvoj, 1928 : 91 ; Burton, 1928 : 114 ; *G. vagabundus* Topsent, 1928 : 314, pl. xi, fig. 1 ; *G. flagellifer* Hentschel, 1929 : 978.

OCCURRENCE.—Stn. M.B. I (d), September 17, 1933, Bay between Great Hanish and Suyul Hanish Islands, Red Sea, 26 m., bottom sand, shells and coral ; Stn. 157, April 6, 1934, Maldive Area (4° 43' 48" N., 72° 55' 24" E. to 4° 44' 00" N., 72° 54' 18" E.), 229 m., bottom coral rock.

REMARKS.—The specimen from Stn. 157 is encrusting, about 1 mm. thick, with oxea 0.32 by 0.02 mm., ordinary sigmata 0.03–0.08 mm. chord and flagellate sigmata 0.09 mm. chord. The specimen from Stn. M.B. I (d) is massive, 10 mm. across, with microscleres of similar dimensions but with oxea measuring 0.17 by 0.01 mm.

DISTRIBUTION.—Arctic (Iceland, Barents Sea) ; North Atlantic (Canada : *teste* Stephens, 1921, SW. Ireland, Azores) ; Mediterranean (Monaco, Adriatic) ; Marion Is. ; Indian Ocean (Andamans, Saya da Malha) ; New Zealand ; 91–1378 m.

*Haliclona cf. ochracea* (Keller).

*Ceraochalina ochracea* Keller, 1889 : 387, pl. xxiv, fig. 46.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea (13° 35' 30" N., 42° 35' 05" E.), 245 m.

REMARKS.—The present specimen is so strikingly like the holotype, as figured by Keller, that it can be called in a literal sense, practically identical with it. Its spicules measure 0.2 by 0.012 mm., as against 0.1 by 0.0015 mm. in the holotype. In spite of the difference in the sizes of the spicules, however, I feel confident that this is a further representative of Keller's species.

DISTRIBUTION.—Red Sea.

*Haliclona contignata* (Thiele).

*Petrosia contignata* Thiele, 1899 : 20, pl. ii, fig. 8, pl. v, fig. 13.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea (13° 31' 00" N., 42° 31' 00" E.), 55 m. ; Stn. 24, October 9, 1933, Gulf of Aden (11° 53' 42" N., 51° 13' 12" E.), 73–220 m., bottom coarse sand, shingle and (?) rock ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" N., 39° 14' 12" E.), 73–165 m.

DISTRIBUTION.—Celebes.

*Haliclona irregularis* (Kirkpatrick).

*Stylotella irregularis* Kirkpatrick, 1900 : 137, pl. xii, fig. 4, pl. xiii, fig. 6 ; *Axinosis irregularis* Hallmann, 1914 : 349.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shingle and (?) rock ; Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73–165 m. ; Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Christmas Island), littoral.

*Haliclona expansa* (Thiele).

*Protoschmidtia expansa* Thiele, 1903 : 939, fig. 4 ; Burton, 1928 : 116.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DISTRIBUTION.—Ternate ; Andamans ; 2377 m.

*Haliclona obtusispiculifera* (Dendy).

*Chalina obtusispiculifera* Dendy, 1905 : 150, pl. x, fig. 9.

OCCURRENCE.—Stn. D (?), September 9, 1933, Red Sea, 23 m.

DISTRIBUTION.—Ceylon.

*Haliclona decidua* Topsent.

*Reniera decidua* Topsent, 1906 : 560.

OCCURRENCE.—Stn. 110, January 14, 1934, Zanzibar Area ( $5^{\circ} 03' 42''$  S.,  $39^{\circ} 15' 24''$  E. to  $5^{\circ} 05' 48''$  S.,  $39^{\circ} 15' 12''$  E.), 73–165 m., bottom rock (?).

DISTRIBUTION.—Red Sea.

*Haliclona tabernacula* (Row).

*Reniera tabernacula* Row, 1911 : 316, fig. 9 ; *R. spinosella* Row, 1911 : 317, fig. 10 ; *Halichondria bubastes* Row, 1911 : 319, fig. 11 ; *Reniera spinosella* Burton, 1926 : 73 ; *R. tabenacula* Burton, 1926 : 74 ; *nec R. spinosella* Thiele, 1905.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Suez Canal ; Red Sea.

*Haliclona seychellensis* (Dendy).

*Petrosia seychellensis* Dendy, 1921 : 35, pl. ii, figs. 3–4, pl. xii, fig. 5.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 112, January 15, 1933, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

REMARKS.—There are nine large specimens, the largest 130 mm. across, and one fragment. Although collected at two widely-separated stations there is a fair agreement between them in external and internal characters.

DISTRIBUTION.—Indian Ocean (Amirante, 40–156 m., Seychelles, 68 m.).

*Haliclona tuberosa* (Dendy).

*Reniera tuberosa* Dendy, 1921 : 33, pl. iii, fig. 2, pl. xii, fig. 2.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Indian Ocean (Saya de Malha, Diego Garcia); 100 m.

*Haliclona cerebrum* (Burton).

*Protoschmidtia cerebrum* Burton, 1928 : 116, pl. i, fig. 2.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73–165 m.

REMARKS.—There is a much damaged specimen, with a skeleton of strongyla forming a close-meshed reticulation, which seems to belong here. The consistency is hard, almost stony, and what little can be seen of the external features agrees with what is known of the holotype. The spicules themselves are 0.4 by 0.016 mm., which is larger than those of the holotype and they should perhaps be described as substrongyla. Despite these differences, and in spite of the geographical separation, the identification of this specimen with the holotype from the Andamans seems fairly well justified.

DISTRIBUTION.—Andamans; 82–378 m.

*Haliclona carteri* sp. n.

*Isodictya simulans* (No. 71), Carter, 1887 : 69; nec *Isodictya simulans* Bowerbank.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E. to 11° 56' 42" N., 50° 39' 12" E.), 37 m., bottom sand and shells; Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge encrusting; surface even, undulating, minutely hispid; oscules small, scattered; texture firm; colour, dried, light brown; skeleton a dense, somewhat confused, subisodictyal reticulation; megascleres oxea, 0.14 by 0.008 mm.; microscleres absent.

DISTRIBUTION.—Mergui Archipelago.

Genus *Adocia* Gray.*Adocia sagittarius* (Sollas).

*Gellius sagittarius* Sollas, 1902 : 212, pl. xv, fig. 7; *G. angulatus*, var. *canaliculata* Dendy, 1905 : 136, pl. ix, fig. 7; *G. canaliculata* Burton, 1928 : 114; nec *G. angulatus*, var. *canaliculata* Topsent, 1904.

OCCURRENCE.—Stn. 139, March 25, 1934, Maldive Area (Anchorage, E. side of Kolumadulu Atoll : 2° 13' 30" N., 73° 09' 00" E.), 57 m., bottom coral sand.

DISTRIBUTION.—Arabian Sea; Ceylon; west coast of Malay Peninsula; littoral to 1150 m.

*Adocia fibulatus* (Schmidt), var. *microsigma* (Dendy).

*Gellius fibulatus* Dendy, 1905 : 136; *G. fibulatus*, var. *microsigma* Dendy, 1916 : 107; Dendy, 1921 : 26; *Adocia fibulatus*, var. *microsigma* Burton, 1934 : 539.

OCCURRENCE.—Stn. 141, March 26, 1934, Maldive Area (3° 04' 30" N., 73° 22' 42" E.), 44 m., bottom coarse sand, shells and coral.

DISTRIBUTION.—Indian Ocean (Okhamandal, Ceylon, Coevity, Coin Peros, Egmont Reef); Great Barrier Reef; 0–31 m.

*Adocia pigmentifera* (Dendy).

*Reniera pigmentifera* Dendy, 1905 : 143, pl. ix, fig. 10.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea ( $13^{\circ} 31' 00''$  N.,  $42^{\circ} 31' 00''$  E.), 55 m.

DISTRIBUTION.—Ceylon, 18 m.

*Adocia digitata* (Baer).

*Halichondria digitata* Baer, 1906 : 12, pl. i, fig. 7, pl. iv. figs. 12–14.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73–165 m.

REMARKS.—The single specimen, a fragment, is digitate, 25 mm. long and 3 mm. diameter. The colour is greenish-yellow and the skeleton like that described by Baer, except that the spicules measure 0.17 by 0.009 mm. instead of 0.1 by 0.005 mm.

DISTRIBUTION.—Zanzibar.

*Adocia* cf. *semifibrosa* (Dendy).

*Reniera semifibrosa* Dendy, 1916 : 111, pl. ii, fig. 13.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells.

REMARKS.—The skeleton of the present specimen contains a good deal of sand in its slender fibres, so that an exact comparison with known species is not possible. It could with equal justice be assigned to *Adocia ramusculoides* (Topsent), *A. hornelli* (Dendy) or *A. fibroreticulata* (Dendy), all from this same area of the Indian Ocean.

*Adocia tufoides* (Dendy).

*Reniera tufoides* Dendy, 1921 : 33, pl. ii, fig. 2, pl. xii, fig. 3.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DISTRIBUTION.—Amirante, 512 m.

*Petrosia testudinaria* (Lamarck).

*Alcyonium testudinarium* Lamarck, 1815 : 167 ; Lamarck, 1816 : 401 ; *Reniera crateriformis* Carter, 1882 : 115 ; *R. testudinaria* Ridley, 1884 : 409 ; *R. crateriformis* Carter, 1887 : 71 ; *Petrosia testudinaria* Dendy, 1889 : 77, pl. iii, figs. 1–3 ; Dendy, 1905 : 144, fig. 1 ; Hentschel, 1912 : 403 ; Topsent, 1920 : 7 ; Wilson, 1925 : 399, pl. xl, fig. 6 ; *P. testudinaria* var. *fstulophora* Wilson, 1925 : 401, pl. xl, fig. 5, pl. xli, figs. 1–2, pl. xlviii, fig. 8 ; *P. testudinaria* Topsent, 1933 : 40.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea ( $13^{\circ} 35' 30''$  N.,  $42^{\circ} 35' 05''$  E.), 245 m., bottom rock and sand ; Stn. 10, September 17, 1933, Red Sea ( $13^{\circ} 31' 00''$  N.,  $42^{\circ} 31' 00''$  E.), 55 m. ; Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73–165 m., bottom rock (?).

DISTRIBUTION.—Ceylon ; Mergui ; Aru Is. ; Queensland, Australia ; Philippines ; 7–15 m.

*Petrosia mauritiana* (Carter).

*Chalina polychotoma*, var. *mauritiana* Carter, 1885 : 402, pl. xiv, fig. 13.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73–165 m., bottom rock (?).

REMARKS.—Carter's original specimen has the main skeleton a loose reticulation of strongyla, 0.017 by 0.003 to 0.32 by 0.018 mm. In addition, there is a dense tangential ectosomal skeleton of similar spicules.

DISTRIBUTION.—Mauritius.

*Petrosia nigricans* Lindgren.

*Petrosia nigricans* Lindgren, 1897 : 480 ; Lindgren, 1898 : 5, pl. xvii, fig. 5, pl. xix, fig. 4 ; *P. imperforata* Thiele, 1899 : 20, pl. ii, fig. 7, pl. v, fig. 12 ; *P. cancellata* Thiele, 1903 : 938, fig. 3 ; *P. similis*, var. *delicatula* Dendy, 1905 : 145 ; *P. similis*, var. *halichondrioides* Dendy, 1905 : 145 ; *P. densissima* Dendy, 1905 : 145, pl. ix, fig. 9 ; *P. nigricans*, var. *irregularis* Hentschel, 1912 : 405 ; *P. mammiformis* Dendy, 1921 : 36, pl. xii, fig. 6 ; *P. dura* Dendy and Frederick, 1924 : 498.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea (13° 35' 30" N., 42° 35' 05" E.), 245 m., bottom rock and sand ; Stn. 10, September 17, 1933, Red Sea (13° 31' 00" N., 42° 31' 00" E.), 55 m. ; Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" N., 39° 14' 12" E.), (73–165 m.) ; Stn. 157, April 6, 1934, Maldive Area (4° 43' 48" N., 72° 55' 24" E. to 4° 44' 00" N., 72° 54' 18" E.), 229 m., bottom coral rock.

DISTRIBUTION.—Ceylon, Salomon, Java, Celebes, Ternate, SW. Australia ; 18–137 m.

Genus *Oceanapia* Gray.

*Oceanapia putridosum* (Lamarck).

*Alcyonium putridosum* Lamarck, 1815 : 168 ; Lamarck, 1816 : 402 ; 1836 : 608 ; *Rhizochalina putridosa* Ridley and Dendy, 1886 : 332 ; Ridley and Dendy, 1887 : 33, pl. viii, fig. 5, pl. ix, figs. 1, 7 ; Whitelegge, 1906 : 406 ; ? Wilson, 1925 : 419 ; ? Burton, 1928 : 118 ; *Phlæodictyon putridosum* Topsent, 1933 : 42, pl. iii, fig. 8 ; nec *Rhizochalina putridosa* Topsent, 1892.

OCCURRENCE.—Stn. 144, March 31, 1934, Maldive Area (5° 26' 06" N., 73° 22' 24" E.), 31 m., bottom coral, shell and sand.

DISTRIBUTION.—Australia (Bass Strait, Port Jackson), 55–70 m., ? Philippines ; ? Indian Ocean (Orissa Coast).

*Oceanapia fistulosa* (Bowerbank).

*Desmacidon fistulosa* Bowerbank, 1873 : 19, pl. iv, figs. 7–8 ; Carter, 1882 : 121.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Australia (Freemantle).



*Oceanapia canalis* (Ridley).

*Rhizochalina canalis* Ridley, 1884 : 422, pl. xxxix, fig. F, pl. xli, fig. r.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Arafura Sea ; Torres Straits ; Port Darwin ; 17–66 m.

*Oceanapia elastica* (Keller).

*Reniera elastica* Keller, 1891 : 306, pl. xvi, figs. 3, 7 ; *Petrosia elastica* Lindgren, 1897 : 480 ; Lindgren, 1898 : 5, pl. xviii, fig. 13, pl. xix, fig. 5 ; *Oceanapia elastica* Burton, 1934 : 546.

OCCURRENCE.—Stn. 139, March 25, 1934, Maldive Area (2° 13' 30" N., 73° 09' 00" E.), 57 m., bottom coral and sand.

DISTRIBUTION.—Red Sea ; Java ; Australia (Great Barrier Reef) ; 34–45 m.

*Oceanapia media* (Thiele).

*Rhizochalina media* Thiele, 1899 : 19, pl. iv, fig. 2, pl. v, fig. 11.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73–165 m.

DISTRIBUTION.—Celebes.

*Oceanapia zoologica* (Dendy).

*Reniera zoologica* Dendy, 1905 : 143, pl. ix, fig. 8.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), depth uncertain, 73–165 m. ; Stn. 112, January 15, 1934, Zanzibar Area (5° 04' 57" S., 39° 13' 18" E.), 113 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Gulf of Manaar).

*Oceanapia incrustata* (Dendy).

*Phlæodictyon incrustatum* Dendy, 1921 : 49, pl. xii, fig. 15.

OCCURRENCE.—Stn. 11, September 18, 1933, Red Sea (12° 55' 42" N., 43° 11' 42" E. to 12° 53' 36" N., 43° 11' 18" E.), 207 m., bottom rock.

DISTRIBUTION.—Indian Ocean (Egmont Reef).

*Oceanapia* cf. *cagayense* (Wilson).

*Phlæodictyon cagayense* Wilson, 1925 : 420, pl. xlii, fig. 3, pl. xlvi, fig. 10.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area (5° 04' 57" S., 39° 13' 18" E.), 113 m., bottom coral rock.

REMARKS.—Of the two specimens, one is large, in pieces, and probably measured 100 mm. across when complete. It is irregularly massive and the colour is a deep greenish-grey, almost black. The second, a fragment, is digitate, a slightly lighter colour than the first, and about 30 mm. long. In appearance and in the structure of the skeleton both bear a strong resemblance to Wilson's species, and the spicules are oxea and sub-

strongyla. The main difference rests in the dimensions of the spicules, which are 0.36 by 0.012 mm., against 0.2 by 0.01–0.014 mm. in the holotype.

DISTRIBUTION.—Philippines.

Genus *Callyspongia* Duchassaing and Michelotti.

*Callyspongia diffusa* (Ridley).

(For synonymy see Burton, 1934 : 541.)

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shingle and (?) rock ; Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), depth uncertain, 73–165 m.

DISTRIBUTION.—Ceylon ; Singapore ; Java ; Australia (Torres Straits, east and south-west coasts) ; littoral to 18 m.

*Callyspongia subarmigera* (Ridley).

*Cladochalina subarmigera* Ridley, 1884 : 397, pl. xxxix, fig. H, pl. xli, fig. L ; *Chalinopora subarmigera* Lendenfeld 1887 : 767 ; *Chalina subarmigera* Lindgren, 1897 : 481 ; Lindgren, 1898 : 13 ; *Callyspongia subarmigera* Burton, 1934 : 540.

OCCURRENCE.—Stn. M.B. I (d), September 17, 1933, Red Sea, 26 m. ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73–165 m., bottom rock (?) ; Stn. M.B. I (b), September 17, 1933, Bay between Great Hanish and Suyul Hanish Islands, Red Sea, 29 m., bottom sand, shell and coral.

DISTRIBUTION.—Northern Australia (Torres Straits, Albany Island) ; Cochin-China ; 5–45 m.

*Callyspongia confœderata* (Ridley).

*Tuba confœderata* Ridley, 1884 : 400 ; *Siphonella laxa* Lendenfeld, 1887 : 803, pl. xxiv, fig. 55 ; *Siphonochalina confœderata* Lendenfeld, 1887 : 803, pl. xxv, fig. 60 ; *S. typica* Lendenfeld, 1887 : 804, pl. xxiv, fig. 54, pl. xxvii, figs. 2–19 ; *S. elastica* Lendenfeld, 1887 : 805 ; *S. paucispina* Lendenfeld, 1887 : 805 ; *S. axialis* Lendenfeld, 1887 : 805, pl. xxiv, fig. 53 ; *S. extensa* varr. *dura*, *elegans* Lendenfeld, 1887 : 806 ; *Siphonella tuberculata* Lendenfeld, 1887 : 808 ; *Spinoseella confœderata* Topsent, 1897 : 479, pl. xix, fig. 20 ; *Callyspongia confœderata* Burton, 1934 : 541.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—Amboina ; Australia (north, west and east coasts).

*Callyspongia fibrosa* (Ridley and Dendy).

*Dasychalina fibrosa* Ridley and Dendy, 1886 : 330.

(For synonymy see Burton, 1934 : 540.)

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn.

53, November 2, 1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—? Off Bahia and Bermuda; ? Mergui; Ceylon; Java; Cochin-China; Aru and Kei Is.; Philippines; Great Barrier Reef; 10–45 m.

*Callyspongia spinosissima* (Dendy).

*Pachychalina spinosissima* Dendy, 1887 : 524, pl. xlv; *P. subcylindrica* Dendy, 1905 : 148, pl. x, figs. 1–2; Dendy, 1921 : 41, pl. viii, fig. 1; *Cladochalina subcylindrica* Burton, 1927 : 511.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shingle and (?) rock; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion; Stn. 50, October 31, 1933, South Arabian Coast ( $18^{\circ} 38' 00''$  N.,  $58^{\circ} 05' 00''$  E.), 1939 m., bottom brown mud; Stn. 53, November 2, 1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

DIAGNOSIS.—Sponge composed of long, subcylindrical branches; surface smooth, often bearing stout spines; texture firm but compressible; oscules conspicuous and scattered along branches; colour, in spirit, yellowish-brown; main skeleton a coarse, irregular reticulation of multispicular fibres, often subdivided by uni- or bispicular fibres; ectosomal tangential skeleton similar; spicules oxea, 0.16–0.2 by 0.006–0.01 mm.

DISTRIBUTION.—Indian Ocean (Providence, Ceylon, Christmas Island); 16–53 m.

*Callyspongia clathrata* (Dendy).

*Chalina clathrata* Dendy, 1905 : 151, pl. x, fig. 3; *Callyspongia clathrata* Burton, 1934 : 543.

OCCURRENCE.—Stn. A, September 6, 1933, Red Sea ( $29^{\circ} 17' 00''$  N.,  $32^{\circ} 43' 00''$  E.), 65 m., bottom soft yellow mud.

DISTRIBUTION.—Ceylon.

*Callyspongia barodensis* sp. n.

*Siphonochalina communis* (pars), Dendy, 1905 : 155; *S. crassifibra* Dendy, 1916 : 114.

HOLOTYPE.—B.M. 25.11.1.230.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge tubular; surface even, smooth; oscules apical; texture firm, elastic; colour, in spirit, yellow to brown; main skeleton a subrectangular reticulation of multispicular fibres (20–30 spicules); ectosomal skeleton a triangular reticulation of multispicular fibres (5–8 spicules) subdivided by a secondary, uni- to bispicular mesh; megascleres oxea, 0.07 by 0.003 mm.; microscleres absent.

DISTRIBUTION.—Indian Ocean (Okhamandal, Ceylon); 5–15 m.

*Callyspongia rowi* sp. n.

*Gelliodes poculum*, var., Row, 1911 : 328.

HOLOTYPE.—B.M. 12.2.1.53.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge tubular; surface even, smooth; oscules apical; texture soft, fragile; colour, in spirit, yellowish-white; main skeleton a subregular rectangular reticulation of multispicular fibres (ascending fibres 3–7 spicules, connectives 2–5 spicules), with occasional uni- or bispicular secondary connectives; ectosomal skeleton a tangential reticulation of uni- or trispicular fibres, enclosing triangular to rectangular mesh, subdivided by a unispicular reticulation; megascleres oxea, 0.14 by 0.008 mm.; microscleres absent (sigmata recorded by Row appear to be foreign).

DISTRIBUTION.—Red Sea; 9 m.

Genus *Gelliodes* Ridley.

*Gelliodes fibulatus* Ridley.

? *Gellius couchi*, var. *ceratina* Ridley, 1884 : 423; *Gelliodes fibulatus* Ridley, 1884 : 427, pl. xxxix, fig. I, pl. xli, fig. b; ? *Fibularia ramosa* Carter, 1887 : 71, pl. vii, figs. 1–3; *Gelliodes fibulata* Ridley and Dendy, 1887 : 47, pl. xii, fig. 2; Lendenfeld, 1887 : 793; ? *Pachychalina joubini* Topsent, 1897 : 480, pl. xix, fig. 19; *P. fragilis* Lindgren, 1897 : 481; Lindgren, 1898 : 8; *Gelloides* (sic) *ramosa* Kieschnick, 1898 : 47; ? *Pachychalina conulosa* Kieschnick, 1898 : 51; *Gelloides ramosa* Kieschnick, 1900 : 565, pl. xlv, fig. 3; ? *Pachychalina conulosa* Kieschnick, 1900 : 568, pl. xlv, fig. 8; *Gelliodes fibulatus* Hentschel, 1912 : 393; ? *Cladochalina joubini* Burton, 1927 : 510; *Sigmaxynissa fibulata* Burton, 1928 : 115; nec *Fibularia ramosa* Carter, 1882.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E. to 11° 56' 42" N., 50° 39' 12" E.), 37 m., bottom sand and shells.

DISTRIBUTION.—Malay Area (Mergui Archipelago, Amboina, Java, Aru Is., Torres Strait); 5–20 m. (? also to 65 m.).

Family DESMACIDONIDÆ.

Sub-family MYCALINÆ.

Genus *Biemna* Gray.

*Biemna fortis* (Topsent).

*Desmacella fortis* Topsent, 1897 : 463, pl. xxi, fig. 30; Sollas, 1902 : 213; *Biemna fortis* Hentschel, 1912 : 350; Burton, 1930 : 523.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53' 42" N., 51° 13' 12" E.), 73–220 m., bottom coarse sand, shingle and (?) rock; Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E. to 11° 56' 42" N., 50° 39' 12" E.), 37 m., bottom sand and shells.

DISTRIBUTION.—Red Sea, Amboina (Topsent); Malay Peninsula, littoral (Sollas); Aru and Kei Islands; 18–40 m., on rocks (Hentschel).

*Biemna trirhaphis* (Topsent).

*Desmacella peachi*, var. *trirhaphis* Topsent, 1897 : 461, pl. xviii, fig. 9, pl. xxi, fig. 35; *Biemna trirhaphis* Burton, 1930 : 523.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea (13° 31' 00" N., 42° 31' 00" E.), 55 m.

DISTRIBUTION.—Amboina.

*Biemna ciocalyptoides* sp. n.

(Text-fig. 14.)

HOLOTYPE.—B.M. 1936.3.4.431.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shingle.

DIAGNOSIS.—Sponge massive, pyramidal, bearing numerous erect, slender, pointed processes; surface mainly smooth, minutely aculeate on the processes; oscules conspicuous, 2–5 mm. diameter, irregularly scattered; texture firm, compressible, fragile; colour

TEXT-FIG 14.—*Biemna ciocalyptoides* sp. n. Style,  $\times 150$ , sigmata, of two sizes, and microxea, in dragmata and one isolated spicule with hair-like raphides between,  $\times 600$ .

in spirit, pale yellowish-grey; skeleton of irregularly scattered styli, 0.9 by 0.032 mm.; microscleres sigmata, of two sizes, 0.012–0.02 and 0.052–0.075 mm. chord respectively, microxea, 0.16 by 0.004 mm., in dragmata, and hair-like raphides, 0.16 mm. long, in wisp-like dragmata measuring 0.4 mm. long.

REMARKS.—The species is characterized by its striking external form and by the undulating, wisp-like strands of raphides. In addition, it differs from all known species of *Biemna* in other details of its spiculation.

It is not possible to be sure of the exact measurements of the raphides. The dragmata measure about 0.4 mm. in length, but in spicule preparations the separated raphides are too fine and too sinuous to be followed readily; and although individual spicules were measured, always about 0.16 mm. long, there was the constant suspicion that they might be incomplete. For the most part, the dragmata remain intact after boiling in nitric acid, and, as a consequence, it is not easy to find individual spicules to measure.

Genus *Desmacella* Schmidt.

*Desmacella annexa* Schmidt.

(For synonymy see Burton, 1930 : 525.)

OCCURRENCE.—Stn. 122, January 22, 1934, Zanzibar Area ( $5^{\circ} 21' 24''$  S.,  $39^{\circ} 23' 00''$  E. to  $5^{\circ} 22' 36''$  S.,  $39^{\circ} 22' 18''$  E.), 732 m., bottom grey-green mud.

REMARKS.—This is the second record for the Indian Ocean of a common North Atlantic species. The present specimen is, moreover, more nearly typical than those from the "Investigator" collections (see Burton, 1928, p. 120).

DISTRIBUTION.—Iceland ; Norway ; south-west Ireland to Bay of Biscay ; Mediterranean ; Florida ; Indian Ocean (Gulf of Oman and Laccadive Sea) ; 40–1331 m., bottom sand and shells, coral, Pteropod ooze.

Genus *Mycale* Gray.

*Mycale (Mycale) sulevoidea* (Sollas).

*Esperella sulevoidea* Sollas, 1902 : 213, pl. xiv, figs. 8–9, pl. xv, fig. 10 ; *Mycale sulevoidea* Hentschel, 1912 : 335, pl. xiii, fig. 6, pl. xviii, fig. 14.

OCCURRENCE.—Stn. M.B.I.(d), September 17, 1933, Red Sea, 26 m., bottom sand, shells and coral.

DISTRIBUTION.—Straits of Malacca ; Arafura Sea ; littoral to 18 m.

*Mycale (Mycale) murrayi* (Ridley and Dendy).

*Esperella murrayi* Ridley and Dendy, 1886 : 338 ; Ridley and Dendy, 1887 : 67, pl. xiii, figs. 11, 13–18, pl. xiv, fig. 1.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.) 73–220 m., bottom coarse sand, shingle and (?) rock.

REMARKS.—Topsent (1924) saw in *Esperella murrayi* a synonym of the North Atlantic *Mycale lingua* (Bowerbank). He may have been right in this, but in view of small differences in the spiculation, and the wide geographical separation, it is preferable to retain a distinction between the two, at least for the moment.

DISTRIBUTION.—Off Port Jackson, Australia, 55–64 m.

*Mycale (Mycale) sulcata* Hentschel.

*Mycale sulcata* Hentschel, 1911 : 307, fig. 11.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shingle and (?) rock ; Stn. 53, November 2, 1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion ; Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

REMARKS.—This species is represented by a small encrusting specimen, having the large anisochelæ so characteristic in shape. Instead of small sigmata (0.014–0.016 mm.) it has large sigmata, 0.04–0.086 mm. chord but mainly of the larger sizes. In addition, the subtylostyli are 0.8 by 0.02 mm., the anisochelæ are 0.04–0.1, 0.024 and 0.016 mm. chord

respectively, and the trichodragmata up to 0.12 mm. long. In spite of these differences, however, the striking appearance of the large anisochelæ is still sufficient to identify this specimen with Hentschel's species.

DISTRIBUTION.—South-West Australia; 1–6 m.

*Mycale (Mycale) massa* (Schmidt) var. *oceanica* Topsent.

*Mycale massa*, var. *oceanica* Topsent, 1924: 91, fig. 2 m–n.

OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50' 00" N., 59° 52' 00" E.), 1046 m., bottom green mud.

REMARKS.—This small, oval specimen, 30 mm. high, has a skeleton very like that described for the var. *oceanica* from the Atlantic. Its megascleres are stronglyloxea, 1.0 by 0.02 mm.; its microscleres anisochelæ, of three sizes, 0.09–0.1, 0.04–0.044 and 0.02 mm. chord respectively, sigmata, of two sizes, 0.01–0.012 and 0.052–0.072 mm. chord respectively, and trichodragmata, 0.03–0.1 mm. long. Not only do the dimensions of the spicules agree closely, but their shapes do also.

It is interesting to find the typical Mediterranean species having a variety in the Atlantic, and the same variety (apparently) in the Indian Ocean.

DISTRIBUTION.—North-West Africa; Azores; 140–175 m.

*Mycale (Mycale) topsenti* sp. n.

(Text-fig. 15.)

HOLOTYPE.—B.M. 1936.3.4.542.

OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50' 00" N., 59° 52' 00" E.), 1046 m., bottom green mud.

DIAGNOSIS.—Sponge small, massive rounded; surface uneven, markedly hispid, with inconspicuous pore-cracks; oscules not apparent; texture soft, compressible; colour, in spirit, pale yellow to dark greenish-grey; skeleton of ascending bundles of subtylostyli ending in a tangential layer of similar megascleres beyond which extend diffuse brushes projecting at right angles to surface; megascleres subtylostyli, 0.9 by 0.018 mm.; microscleres anisochelæ of three sizes, 0.088, 0.04 and 0.02 mm. chord respectively, sigmata, 0.06–0.08 mm. chord, and trichodragmata, 0.06 mm. long.

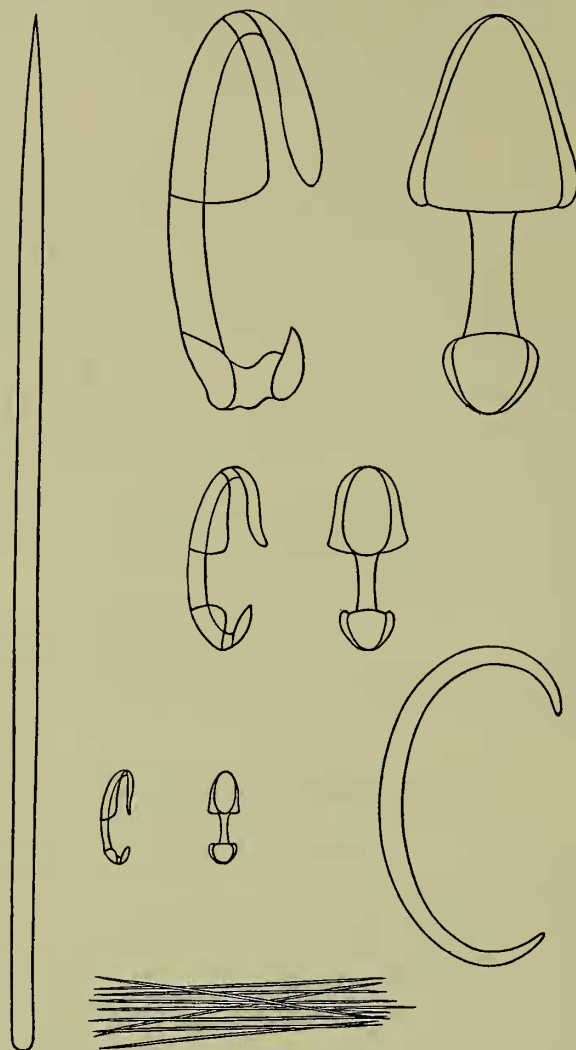
REMARKS.—The shapes of the spicules and the combination of categories present gives this species a strong resemblance to *M. pellucida* (Ridley) and *M. gelatinosa* (Ridley), which have much in common with each other. But whereas these two fall into the subgenus *Ægagropila* (see Topsent, 1924), the present species is more properly to be placed in the subgenus *Mycale*.

Genus *Hamacantha* Gray.

*Hamacantha mindanaensis* Wilson.

*Hamacantha esperioides*, var. *mindanaensis* Wilson, 1925: 437.

OCCURRENCE.—Stn. 152, April 4, 1934, Maldive Area (4° 49' 24" N., 72° 46' 30" E. to 4° 48' 42" N., 72° 40' 30" E.), 878 m., bottom green sand; Stn. 157, April 6, 1934, Maldive



TEXT-FIG. 15.—*Mycale topsenti* sp. n. Subtylostyle,  $\times 150$ , anisochelæ of three sizes, sigma and trichodragmata, all  $\times 600$ .

Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DISTRIBUTION.—Philippines.

*Hamacantha simplex* sp. n.

(Text-fig. 16.)

HOLOTYPE.—B.M. 1936.3.4.412.

OCCURRENCE.—Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DIAGNOSIS.—Sponge thinly encrusting; surface smooth, even; oscules not apparent; textile soft; colour, in spirit, white; main skeleton a confused reticulation of oxea, 0.24 by 0.007 mm., with a ectosomal, tangential reticulation of similar spicules; microscleres diancistra, 0.17 mm. chord, and sigmata, 0.017–0.02 mm. chord.



Genus *Guitarra* Carter.

*Guitarra fimbriata* Carter.

(For synonymy see Burton, 1929 : 426.)

OCCURRENCE.—Stn. 11, September 18, 1933, Red Sea ( $12^{\circ} 55' 42''$  N.,  $43^{\circ} 11' 42''$  E. to  $12^{\circ} 53' 36''$  N.,  $43^{\circ} 11' 18''$  E.), 207 m., bottom rock; Stn. 177, May 2, 1934, Gulf of Aden ( $12^{\circ} 01' 54''$  N.,  $50^{\circ} 39' 12''$  E.), 366 m., bottom green mud and rock.

DISTRIBUTION.—Gulf of Mexico; Azores; Falkland Islands; South Georgia; Antarctic; New Zealand; Indian Ocean (Okhamandal); 64–1165 m.



TEXT-FIG. 16.—*Hamacantha simplex* sp. n. Oxeote,  $\times 150$ , diancistron and sigmata,  $\times 600$ .

Sub-family MYXILLINÆ.

Genus *Myxilla* Schmidt.

*Myxilla simplex* (Baer).

*Dendoryx simplex* Baer, 1906 : 21, pl. ii, fig. 7, pl. v, figs. 20–25; *Myxilla simplex* Stephens, 1915 : 447, pl. xxxix, figs. 1b, 4c.

OCCURRENCE.—Stn. 24, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shells and (?) rock.

REMARKS.—It is surprising to find this species represented in the hauls from the Gulf of Aden and I was inclined at first to doubt the accuracy of the identification. The spiculation is, however, so closely similar to that described by Stephens that there is little room for doubt.

DISTRIBUTION.—South Africa (Table Bay, Saldanha Bay); littoral to 46 m.

*Myxilla dendyi* sp. n.

*Myxilla incrustans* Dendy, 1921 : 89; nec *M. incrustans* (Johnson) Autt.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge massive or encrusting, and agglutinating, usually containing a considerable quantity of sand and other foreign matter in its tissues ; surface even, smooth ; texture soft and compressible ; vent not seen ; pores in sieves ; colour, in spirit, pale greyish-yellow to light brown ; skeleton a subsodictyal network of acanthostyli, with mucronate tornota ; microscleres chelæ spatuliferæ and sigmata of one size only.

Dimensions of spicules :

- (1) acanthostyli, 0.16 by 0.008 mm.,
- (2) tornota, with a single mucron at each end, 0.16 by 0.003 mm.,
- (3) chelæ spatuliferæ, 0.02 mm., chord,
- (4) sigmata, up to 0.035 mm. chord.

REMARKS.—This species has some resemblance to the well known *Myxilla incrustans* (Johnson) but differs in four well defined characters :

- (1) The spicules are smaller ;
- (2) the chelæ are not differentiated into two categories ;
- (3) the tornota have no ornament other than the single mucron ;
- (4) the body of the sponge is filled with foreign matter.

DISTRIBUTION.—Praslin Reef, Indian Ocean.

Genus *Lissodendoryx* Topsent.

*Lissodendoryx ciocalyptoides* sp. n.

(Text-fig. 17.)

HOLOTYPE.—B.M. 1936.3.4.488.

OCCURRENCE.—Stn. 177, May 2, 1934, Gulf of Aden (12° 01' 54" N., 50° 39' 12" E.), 366 m., bottom green mud and rock.

DIAGNOSIS.—Sponge incomplete, consisting of a hollow digitate process ; surface rugose, hirsute ; oscules not apparent ; texture soft ; colour, in spirit, pale yellow ; skeleton subsodictyal, ascending fibres 2–4 spicules thick, connectives uni- or bispicular ; megascleres styli, 0.6 by 0.024 mm., tornota, with ends strongylote, subtylote or bluntly oxeote, 0.28 by 0.008 mm. ; microscleres isochelæ, 0.08 mm. chord, rarely as little as 0.04 mm. chord.

REMARKS.—The species differs from others of the genus in the absence of a second category of microscleres combined with the large size of the styli.

*Lissodendoryx damirioides* sp. n.

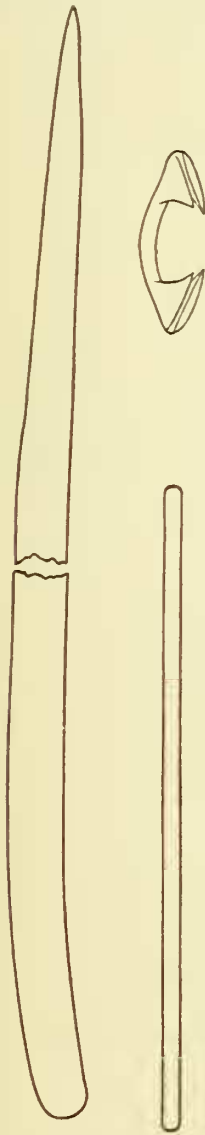
(Text-fig. 18)

HOLOTYPE.—B.M. 1936.3.4.547.

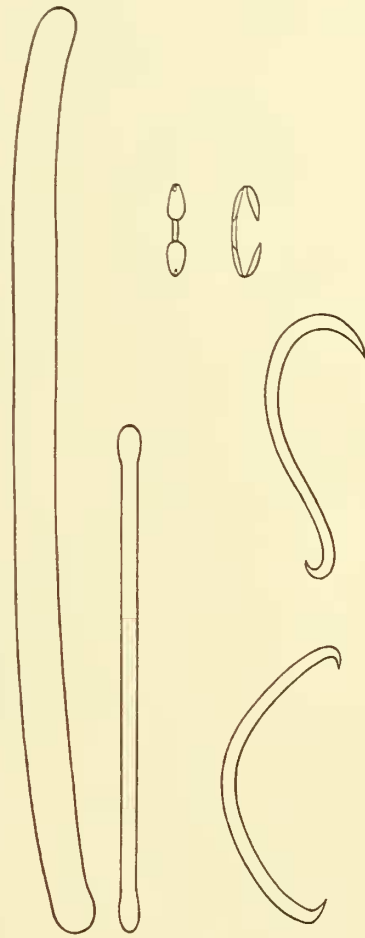
OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50' 00" N., 59° 52' 00" E.), 1046 m., bottom green mud.

DIAGNOSIS.—Sponge small, encrusting to irregular, low-lying and massive ; surface uneven, subaculeate ; oscules minute, scattered ; texture delicate, friable ; colour, in

spirit, pale yellow; skeleton an irregular sub-isodictyal reticulation of smooth, flexuous strongyla, 0.41 by 0.018 mm.; tornota with tylote ends scattered in ectosome and interstitially to main skeleton, 0.22 by 0.006 mm.; microscleres isochelæ, 0.02 mm. chord, and sigmata, 0.06 mm. chord.



TEXT-FIG. 17.—*Lissodendoryx ciocalyptoides* sp. n.  
Style and tornote,  $\times 300$ , isochela,  $\times 600$ .



TEXT-FIG. 18.—*Lissodendoryx damirioides* sp. n.  
Stongyle and tornote,  $\times 300$ , isochelæ and sigmata,  $\times 600$ .

REMARKS.—At first sight these specimens appeared to represent a new genus related to *Damiria* Keller and *Damiriopsis* Burton. Their real place seems, however, to be in the genus *Lissodendoryx*, where they find their nearest relative in *L. grata* (Thiele). Examination of the new species leads to the suggestion that *Damiria simplex* Keller and *Damiriopsis bronstedti* Burton should be more correctly regarded as aberrant members of the genus *Lissodendoryx*.

*Lissodendoryx tubicola* sp. n.

(Text-fig. 19.)

HOLOTYPE.—B.M. 1936.3.4.555.

OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast (21° 50' 00" N., 59° 52' 00" E.), 1046 m., bottom green mud.

TEXT-FIG. 19.—*Lissodendoryx tubicola* sp. n. Style and tornote,  $\times 300$ , isochela,  $\times 600$ .

DIAGNOSIS.—Sponge small, encrusting to low-lying and irregularly massive, living on worm-tubes; surface subcerebriform, minutely hispid; oscules minute, scattered; texture soft, compressible; colour, in spirit, pale yellow; skeleton an irregularly subsodictyal reticulation of smooth styli, 0.5 by 0.018 mm.; tornota with tylote ends, occasionally bearing a few microspines, 0.36 by 0.006 mm.; microscleres isochelæ, 0.028–0.036 mm. chord.

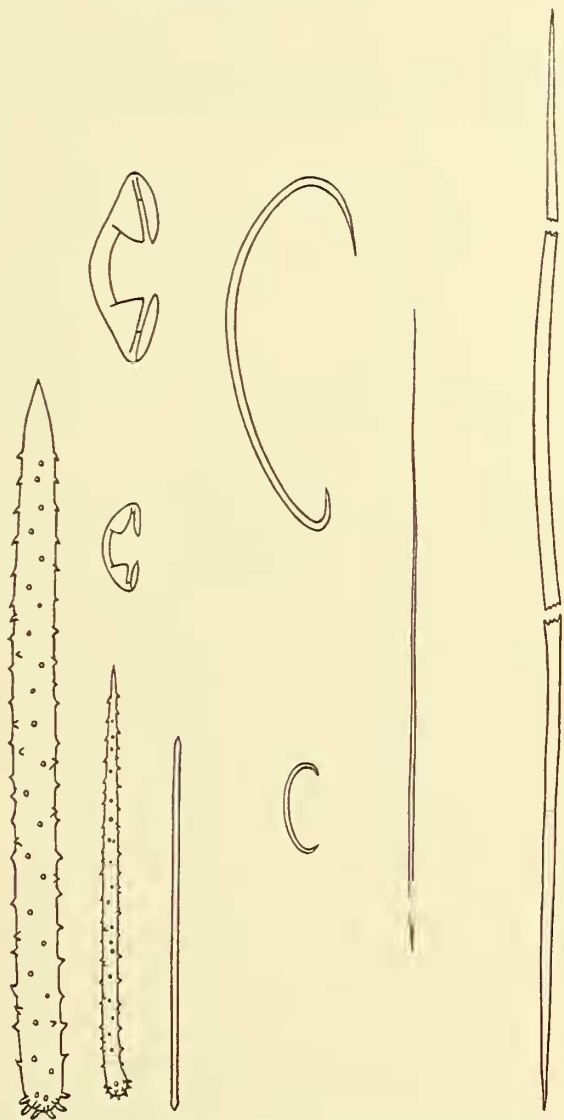
Genus *Ectyodoryx* Lundbeck.

*Ectyodoryx raphidiophora* sp. n.

(Text-fig. 20.)

HOLOTYPE.—B.M. 1936.3.4.482.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand, shells and (?) rock.



TEXT-FIG. 20.—*Ectyodoryx raphidiophora* sp. n. Acanthostyli and tornota,  $\times 300$ , isochelæ, sigmata and raphides, of two sizes,  $\times 600$ .

DIAGNOSIS.—Sponge massive, somewhat lobose; surface even, minutely hispid; oscules small, scattered; texture soft, compressible; colour, in spirit, yellowish-brown; skeleton a subsisodictyal reticulation of acanthostyli, 0.32 by 0.016 mm., sparingly echinated at nodes by curved acanthostyli, 0.1–0.22 by 0.008 mm., and with scarce tornota, strongly ote or subtylote or submucronate at ends, 0.16 by 0.004 mm., scattered interstitially;

microscleres isochelæ, of two sizes, 0.016–0.02 and 0.04–0.06 mm. chord respectively, sigmata, of two sizes, 0.02 and 0.08 mm. chord respectively, and trichodragmata, 0.14 by 0.002 mm. and 0.4 by 0.004 mm.

REMARKS.—The species is distinguishable from others of the genus by the presence of trichodragmata.



TEXT-FIG. 21.—*Ectyodoryx coralliophila* sp. n. Style, acanthostyle and tornote,  $\times 300$ , isochela,  $\times 600$ .

*Ectyodoryx coralliophila* sp. n.

(Text-fig. 21.)

HOLOTYPE.—B.M. 1936.3.4.505.

OCCURRENCE.—Stn. 54, November 3, 1933, South Arabian Coast ( $21^{\circ} 50' 00''$  N.,  $59^{\circ} 52' 00''$  E.), 1046 m., bottom green mud; Stn. 157, April 6, 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

DIAGNOSIS.—Sponge encrusting to massive and low-lying on coral; surface uneven, glabrous; oscules small, inconspicuous; texture soft, delicate; colour, in spirit, pale yellowish-brown; skeleton a scattered and irregular reticulation of smooth styli, echinated at nodes by acanthostyli, with an ectosomal, tangential layer of tornota; megascleres

styli, 0.45 by 0.012 mm., acanthostyli, 0.2 by 0.012 mm., and tornota with tylote ends, 0.32 by 0.006 mm.; microscleres isochelæ arcuatæ, 0.024–0.052 mm. chord.

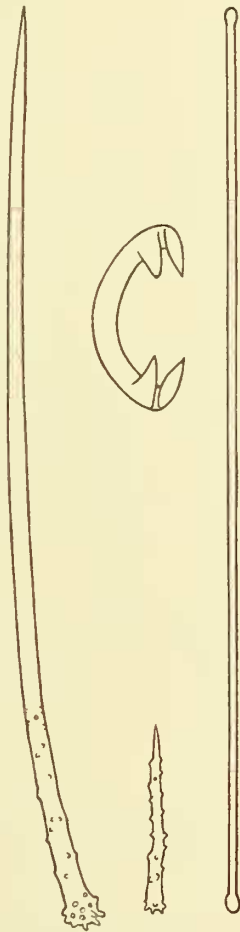
Genus *Hymedesmia* Bowerbank.

*Hymedesmia murrayi* sp. n.

(Text-fig. 22.)

HOLOTYPE.—B.M. 1936.3.4.487.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73–165 m.



TEXT-FIG. 22.—*Hymedesmia murrayi* sp. n. Acanthostyli, of two sizes, and tornote,  $\times 300$ , isochela,  $\times 600$ .

DIAGNOSIS.—Sponge thinly encrusting; surface even; oscules not apparent; texture soft; colour, in spirit, whitish; skeleton of wisp-like fibres of tornota, with single tornota scattered in ectosome, and occasional acanthostyli; megascleres acanthostyli, of two sizes, larger spined in basal third only, 0.4 by 0.008 mm., smaller entirely-spined, 0.08 by 0.008 mm., tornota, with strongylote to submucronate ends, 0.4 by 0.004 mm.; microscleres isochelæ, 0.04–0.044 mm. chord.

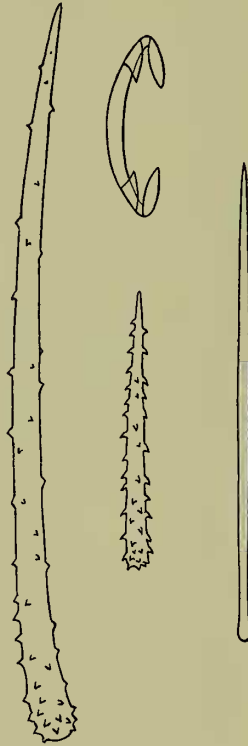
Genus *Phorbas* Duchassaing and Michelotti.*Phorbas styliferus* sp. n.

(Text-fig. 23.)

HOLOTYPE.—1936.3.4.526.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coral, sand and shells.

DIAGNOSIS.—Sponge lamellar, irregular, with much foreign debris incorporated; surface uneven, minutely hispid; oscules not apparent; pores in sieves; texture firm,

TEXT-FIG. 23.—*Phorbas styliferus* sp. n. Acanthostyli, of two sizes, and tornote,  $\times 300$ , isochela,  $\times 600$ .

compressible; colour in spirit, light brown; skeleton of ascending plumose fibres, branching and anastomosing, of large and small acanthostyli, cored by styliform tornota, with ectosomal brushes of similar tornota; spicules acanthostyli, 0.12 by 0.008 and 0.32 by 0.012 mm., the two sizes connected by intermediates; tornota styliform, 0.212 by 0.004 mm.; microscleres isochelæ, 0.028–0.068 mm. chord.

REMARKS.—The specimen is fragmentary and is in a poor state of preservation. In addition to the sand and calcareous debris included in the tissues, there are in places foreign spicules, such as large oxea and anatriænes. Some raphides noted in places are probably also foreign to this sponge.



Genus *Desmapsamma* Burton.*Desmapsamma anchorata* (Carter).

*Fibularia anchorata* Carter, 1882 : 283 ; *Desmacidon reptans* Ridley and Dendy, 1886 : 345 ; Ridley and Dendy, 1887 : 105, pl. xxiii, fig. 7 ; Lindgren, 1897 : 482 ; Lindgren, 1898 : 21 ; *D. carterianum* Arndt, 1927 : 147 ; *Desmapsamma anchorata* Burton, 1934 : 547.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73–165 m.

DISTRIBUTION.—West Indies ; Bahia ; Great Barrier Reef ; 13–82 m.

Genus *Iotrochota* Ridley.*Iotrochota baculifera* Ridley.

*Iotrochota baculifera* Ridley, 1884 : 435, pl. xxxix, fig. M, pl. xlii, fig. f ; *I. baculifera*, var. *flabellata* Dendy, 1887 : 158 ; Dendy, 1889 : 84 ; *I. baculifera* Topsent, 1893 : 174 ; Topsent, 1897 : 455 ; Lindgren, 1897 : 482 ; Lindgren, 1898 : 18 ; Thiele, 1899 : 18, pl. ii, fig. 6 ; *I. baculifera*, var. *tumescens* Kirkpatrick, 1900 : 136, pl. xiii, fig. 1 ; *I. baculifera* Thiele, 1903 : 947 ; Dendy, 1905 : 165 ; *I. baculifera*, var. *minor* Hentschel, 1911 : 329 ; *I. baculifera* Hentschel, 1912 : 347 ; Dendy, 1916 : 123 ; Dendy, 1921 : 97 ; Burton and Rao, 1932 : 353.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea ( $13^{\circ} 31' 00''$  N.,  $42^{\circ} 31' 00''$  E.), 55 m. ; Stn. M.B. I(d), September 17, 1933 ; Red Sea ( $13^{\circ} 39' 30''$  N.,  $42^{\circ} 43' 00''$  E.), 26 m.

DISTRIBUTION.—Okhamandal ; Ceylon ; Madras ; Providence ; Amirante ; Seychelles ; Mascarenes ; Nicobars ; Christmas Is. ; Celebes ; Amboina ; Ternate ; Cochin-China ; Aru Is. ; Port Darwin ; South-West Australia ; littoral to 66 m., bottom mud, sand, rock and coral.

Genus *Acanthancora* Topsent.*Acanthancora stylifera*, sp. n.

(Text-fig. 24.)

HOLOTYPE.—B.M. 1936.3.4.600.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

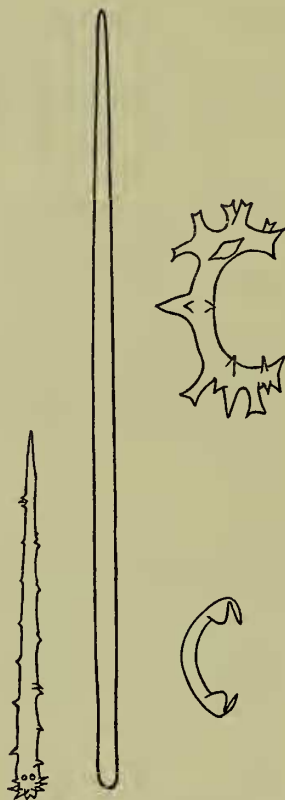
DIAGNOSIS.—Sponge encrusting, small, agglutinating ; surface even ; oscules not apparent ; texture firm, compressible ; colour, in spirit, pale yellow ; skeleton a dense mass of spined chelæ, with stylote tornota scattered between acanthostyli (presumably echinating substratum ; megascleres acanthostyli, 0.16 by 0.008 mm., tornota styliform, 0.36 by 0.008 mm. ; microscleres isochelæ arcuatae, 0.026 mm. chord, and spined isochelæ, 0.04 mm. chord including spines.

REMARKS.—The holotype is a very small specimen growing among a mixture of calcareous debris, and the form of the skeleton is obscured by the abundant spined chelæ. Acanthostyli occur in the boiled-out spicule preparations though they were not seen in hand sections. It is presumed that these echinate the substratum.

*Damirina* gen. n.

GENOTYPE.—*Damirina verticillata* sp. n.

DIAGNOSIS.—Myxillinæ with skeleton an isodictyal reticulation of verticillately-spined acanthostrongyla; with dermal tornota; microscleres absent.



TEXT-FIG. 24.—*Acanthancora stylifera* sp. n. Acanthostyle and tornote,  $\times 300$ , isochelæ, simple and ornamented,  $\times 600$ .

*Damirina verticillata* sp. n.

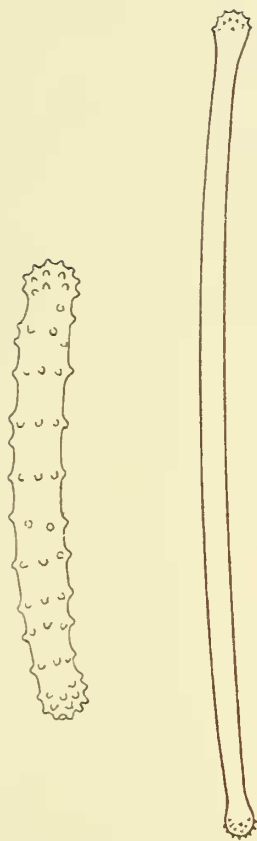
(Text-fig. 25.)

HOLOTYPE.—B.M. 1936.3.4.510.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge encrusting, with hollow fistulæ; surface even, glabrous; oscules (? at ends of fistulæ); texture firm, friable; colour, in spirit, deep brown; main skeleton a unispicular, subisodictyal skeleton of acanthostrongyla, 0.2 by 0.02 mm., with tornota, having tylote ends microspined, 0.36 by 0.01 mm.; microscleres absent.

REMARKS.—The genus *Damirina* is of uncertain position and finds its nearest relatives among certain Myxillinæ with reduced spiculation, such as *Damiriella* Burton (1935, p. 404).



TEXT-FIG. 25.—*Damirina verticillata* sp. n. Acanthostrongyle and tornote,  $\times 300$ .

### Genus *Tedania* Gray.

#### *Tedania nigrescens* (Schmidt).

*Myxilla anhelans* (pars) Schmidt, 1862 : 72 ; *Reniera nigrescens* Schmidt, 1862 : 74 ; *R. digitata* Schmidt, 1862 : 75, pl. vii, fig. ii ; *R. ambigua* Schmidt, 1864 : 39, pl. iv, fig. 8 ; *Thalysias ignis* Duchassaing and Michelotti, 1864 : 83, pl. xviii, figs. 1-2 ; *Tedania digitata* Gray, 1867 : 520 ; *T. ambigua* Gray, 1867 : 520 ; *Reniera muggiana* Schmidt, 1868 : 28 ; *R. ambigua* Schmidt, 1868 : 31 ; ? *Halichondria aspera* Bowerbank, 1875 : 287 ; *Reniera digitata* Carter, 1882 : 287, pl. xi, fig. 3 ; *Tedania digitata* Ridley, 1884 : 417 ; Carter, 1886 : 52 ; *T. digitata*, var. *verrucosa* Carter, 1886 : 53 ; *T. digitata* Ridley and Dendy, 1887 : 51, pl. ix, fig. 3 ; *T. digitata* varr. *fibrosa, bermudensis* Ridley and Dendy, 1887 : 51 ; *T. nigrescens* Vosmaer, 1887 : 338 ; *T. digitata* Dendy, 1887 : 157 ; *T. rubicunda* Lendenfeld, 1888 : 190 ; *T. rubra* Lendenfeld, 1888 : 191 ; *T. chevreuxi* Topsent, 1891 : 13, pl. ii, figs. 1-2 ; *T. assabensis* Keller, 1891 : 313, pl. xvi, figs. 11-12 ; *T. brucei* Wilson, 1894 : 320, pls. xix, xx ; *T. digitata* Dendy, 1895 : 258 ; Lindgren, 1897 : 481 ; *T. digitata*, var. *vulcani* Lendenfeld, 1897 : 112, pl. x, figs. 117-119 ; *T. digitata* Lindgren, 1898 : 17, pl. xix, fig. 10 ; Wilson, 1902 : 395 ; *T. digitata* var. *sansibarensis* Baer, 1906 : 17, pl. i, fig. 11, pl. iv, figs. 26-31, pl. v, figs. 1-2 ; *T. digitata*, var. *fragilis* Baer, 1906 : 18, pl. ii, fig. 3 ; *T. digitata*, var. *conica* Baer, 1906 : 19, pl. ii, fig. 4 ; *T. ignis* Verrill, 1907 : 339 ; *T. assabensis* Row, 1911 : 353 ; *T. digitata* Hentschel, 1911 : 332 ; *T. digitata*, var. *inermis* Hentschel, 1911 : 333 ; *T. digitata*, var. *polytyla* Hentschel, 1911 : 333 ; *T. rubicunda* Hentschel, 1911 : 334 ; *T. digitata* Hentschel, 1912 : 348 ; *T. dirhaphis* Hentschel, 1912 : 349, pl. xix, fig. 20 ; *T. digitata*, var. *rubicunda* Hallmann, 1914 : 366, pl. xvii, fig. 4, text-fig. 11 ; *T. digitata*, var. *rubra* Hallmann, 1914 : 371, text-fig. 12 ; *T. nigrescens* Topsent, 1920 : 16 ; *T. digitata* Dendy, 1921 : 99 ; *T. nigrescens* Babić, 1921 : 84 ; Babić, 1922 : 245 ; *T. digitata* Topsent, 1925 : 703 ; *T. assabensis* Burton, 1926 : 81 ; *T. digitata* Shaw, 1927 : 434 ; Arndt, 1927 : 146, pl. iii, fig. 7 ;

Topsent, 1928 : 247 ; *T. chevreuxi* Burton, 1929 : 71 ; *T. nigrescens* Burton, 1932 : 346, fig. 44 ; Burton and Rao, 1932 : 353 ; *Xytopsihis asperus* de Laubenfels, 1936 : 61.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea ( $13^{\circ} 35' 30''$  N.,  $40^{\circ} 35' 05''$  E.), 245 m. ; Stn. 10, September 17, 1933, Red Sea ( $13^{\circ} 31' 00''$  N.,  $42^{\circ} 31' 00''$  E.), 55 m. ; Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells.

REMARKS.—This species has been recorded many times from a world-wide belt bounded by latitudes  $40^{\circ}$  north and  $40^{\circ}$  south, outside which it is rarely found (see Burton 1932, p. 346). It is apparently of common occurrence, having been taken from sandy, muddy and rocky substrata, from corals and from mangrove roots. Its abundance and ecology seem to approximate to those of the *Hymeniacidon perlevis* in the north temperate zone. Most abundant in the littoral zone and in shallow waters, it has hitherto been found at depths not exceeding 120 m.

DISTRIBUTION.—Between latitudes  $40^{\circ}$  N. and  $40^{\circ}$  S. ; littoral to 245 m.

#### Genus *Strongylacidon* Lendenfeld.

##### *Strongylacidon inæqualis* (Hentschel).

*Cacochalina truncatella*, var. *mollissima* Lendenfeld, 1887 : 763, pl. xxvii, fig. 27 ; *Batzella inæqualis* Hentschel, 1911 : 325, fig. 20 ; Burton, 1927 : 292 ; Burton, 1934 : 550.

OCCURRENCE.—Stn. M.B. II(b), October 28, 1933, coastal zone of Arabian coast ( $17^{\circ} 33' 30''$  N.,  $56^{\circ} 01' 30''$  E.), 26 m.

REMARKS.—*Cacochalina truncatella* var. *mollissima* and *Batzella inæqualis* appear to be identical in all respects, but the first was taken at Port Chalmers, New Zealand, and the second off the South-West coast of Australia. The present specimens agree very closely in the size and shape of the spicules and in the structure of the skeleton. Their external form is irregularly branched (probably repent) and in their present macerated condition look very like what is understood by a *Cacospongia*. The surface tissues are gone, so that it is not possible to say if the surface was smooth. There is, however, every indication that it was conulose ; and this constitutes the main difference between the "John Murray" specimens and those described by Lendenfeld and Hentschel.

DISTRIBUTION.—Port Chalmers, New Zealand (depth unknown) ; South-West Australia ; 0.7–5.5 m.

#### Genus *Lithoplocamia* Dendy.

##### *Lithoplocamia lithistoides* Dendy.

*Lithoplocamia lithistoides* Dendy, 1921 : 79, pl. xiv, fig. 6.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea ( $13^{\circ} 35' 30''$  N.,  $42^{\circ} 35' 05''$  E.), 245 m., bottom rock and sand ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Mauritius, 183 m. ; Seychelles, 71 m.

Genus *Agelas* Duchassaing and Michelotti.*Agelas mauritianus* (Carter).

*Ectyon mauritianus* Carter, 1883 : 310, pl. xii, fig. 3 ; *Agelas mauritianus* Ridley and Dendy, 1887 : 164, pl. xxix, fig. 10 ; *A. cavernosa* Thiele, 1903 : 963, fig. 28 ; *A. mauritiana* Dendy, 1905 : 174.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells.

DISTRIBUTION.—Mauritius ; Ceylon ; Ternate ; (the "Challenger" record for Tristan da Cunha is almost certainly incorrect).

## Sub-family CLATHRIINÆ.

Genus *Clathria* Schmidt.*Clathria frondifera* (Bowerbank).

*Halichondria frondifera* Bowerbank, 1875 : 288 ; *Amphilectus frondifera* Vosmaer, 1880 : 115 ; *Clathria frondifera* Ridley, 1884 : 488, pl. xlii, fig. i, pl. liii, fig. J.

OCCURRENCE.—Stn. M.B. I (d), September 17, 1933, Red Sea ( $13^{\circ} 39' 30''$  N.,  $42^{\circ} 43' 00''$  E.), 26 m., bottom sand, shells and coral.

DISTRIBUTION.—Straits of Malacca ; Thursday Island ; Price of Wales Channel, Percy Island and Fitzroy Island, Australia ; 7–20 m., bottom sand, mud and shells.

*Clathria aculeata* Ridley.

*Clathria aculeata* Ridley, 1884 : 443, pl. xl, fig. I, pl. xlii, fig. K ; Ridley and Dendy, 1887 : 147 ; Burton, 1934 : 558.

OCCURRENCE.—Stn. 10, September 17, 1933, Red Sea ( $13^{\circ} 31' 00''$  N.,  $42^{\circ} 31' 00''$  E.), 55 m. ; Stn. M.B. I (d), September 19, 1933, Red Sea ( $13^{\circ} 39' 30''$  N.,  $42^{\circ} 43' 00''$  E.), 29 m., bottom sand, shells and coral ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

REMARKS.—The skeletons of both the "Alert" and the "Challenger" specimens agree in their gross structure, though they differ in the finer details of spiculation. The same is true of the Barrier Reef specimens. In all there is a network of spongin fibres cored by subtylostyli and echinated by acanthostyli, with main styli (often spined or tuberculated at the base) sparingly echinating the fibres. There is a dermal skeleton of smaller subtylostyli and the microscleres are isochelæ palmatæ, and toxa varying from 0.04 to 0.35 mm. long. The present specimens, though separated geographically resemble the others closely.

It is possible that *C. coralliophila* Thiele is synonymous with *C. aculeata*.

DISTRIBUTION.—Australia (Torres Straits and Great Barrier Reef) ; 5–15 m., bottom sand and coral mud.

*Clathria procera* (Ridley).

*Rhaphidophlus procerus* Ridley, 1884 : 451, pl. xxxix, fig. K, pl. xlii, fig. O ; *Echinonema gracilis* Ridley, 1884 : 617, pl. liv, fig. 1 ; *Rhaphidophlus spiculosus* Dendy, 1889 : 86, pl. iv, fig. 4 ; *Clathria spiculosa*, et var. *ramosa* Dendy, 1905 : 171 ; *C. spiculosa*, et varr. *ramosa*, *macilentata* Hentschel, 1912 : 363–364 ; *C. spiculosa* Dendy, 1916 : 128 ; *C. procera* Dendy, 1921 : 64 ; *Tenacia procera* Burton and Rao, 1932 : 340.

OCCURRENCE.—Stn. M.B. I (d), September 17, 1933, Red Sea ( $13^{\circ} 39' 30''$  N.,  $42^{\circ} 43' 00''$  E.), 26 m., bottom sand, shells and coral; Stn. M.B. II (b), October 28, 1933, Arabian Coast ( $17^{\circ} 33' 30''$  N.,  $56^{\circ} 01' 30''$  E.), 26 m.

REMARKS.—It is probable that *Clathria cervicornis* Thiele (1903 : 959) is synonymous with this species.

DISTRIBUTION.—Indian Ocean (Arabian Sea, Okhamandal, Gulf of Manaar, Cape Cormorin, Ceylon, Tuticorin, Amirante, Seychelles, Praslin Reef, Cargados Carajos, Mascarene Is.); Aru Is.; Australia; Port Darwin; 4–71 m., bottom sand, mud, shells and dead coral.

*Clathria mæandrina* Ridley.

*Clathria mæandrina* Ridley, 1884 : 614, pl. liii, fig. I, pl. liv, fig. h.

OCCURRENCE.—Stn. M.B. I (d) September 17, 1933, Red Sea ( $13^{\circ} 39' 30''$  N.,  $42^{\circ} 43' 00''$  E.), 26 m., bottom sand, shells and coral.

DISTRIBUTION.—Amirante; 31 m., bottom coral.

*Clathria mixta* Hentschel.

*Clathria mixta* Hentschel, 1912 : 367, pl. xiii, fig. 8, pl. xix, fig. 30.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

REMARKS.—The specimen is irregularly massive and the skeleton typical except for the absence of small toxa and the inclusion of much sand in the fibres.

DISTRIBUTION.—Aru Island; 18 m., bottom rocky.

*Clathria spicata* Hallmann.

*Echinonema anchoratum*, var. *lamellosa* Whitelegge, 1901 : 82; *Clathria spicata* Hallmann, 1912 : 210; Dendy, 1921 : 65, pl. v, fig. 2, pl. xiii, fig. 4; nec *Echinonema anchoratum*, var. *lamellosa* Lendenfeld, 1888.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells.

REMARKS.—Dendy speaks of there being no well developed dermal skeleton. This is, however, true of the abraded parts of the surface only. Where the surface is intact, the smaller subtylostyli are arranged in surface brushes, not only in the present specimen but in Dendy's (1921) specimen.

DISTRIBUTION.—Indian Ocean (Cargados Carajos); Western Australia; 55 m.

*Clathria transiens* Hallmann.

*Clathria transiens* Hallmann, 1912 : 226, pl. xxxiii, figs. 1–3, pl. xxxiv, fig. 2, text-figs. 47–48a.

OCCURRENCE.—Stn. M.B. I (b), September 17, 1933, Red Sea, 29 m., bottom sand, shells and coral.

DISTRIBUTION.—East coast of Australia; 55 m.

*Clathria whiteleggii* Dendy.

*Clathria whiteleggii* Dendy, 1921 : 67, pl. vii, fig. 1, pl. xiii, fig. 5.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–200 m., bottom coarse sand and shingle; Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells; Stn. M.B. II (c), October 28, 1933, Arabian Coast ( $17^{\circ} 33' 30''$  N.,  $56^{\circ} 01' 30''$  E.), 29 m.

REMARKS.—The two specimens are very like the holotype in form, though more irregularly clathrate, and with spiculation almost identical.

A single small specimen consisting of a mass of irregular slender branches, each 1 or 2 mm. in diameter, is doubtfully assigned to this species. The skeleton is very like that of the holotype except that the main styli are always smooth at the base, the acanthostyli are rare and the auxiliary subtylostyli measure 0.4 by 0.004 mm. instead of 0.33 by 0.006 mm.

DISTRIBUTION.—Indian Ocean (Saya de Malha); 100 m.

*Clathria spongiosa* sp. n.

(Text-fig. 26.)

HOLOTYPE.—1936.3.4.427.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea ( $13^{\circ} 35' 30''$  N.,  $42^{\circ} 35' 05''$  E.), 245 m., bottom rock and sand; Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells.



TEXT-FIG. 26.—*Clathria spongiosa* sp. n. Style, subtylostyle and acanthostyle,  $\times 200$ , sigma,  $\times 300$ .

DIAGNOSIS.—Sponge subflabellate, palmo-digitate or ramose, with irregular nodose branches; surface uneven, minutely hispid; oscules not apparent; texture firm, elastic; colour, in spirit, reddish-brown; skeleton an irregular reticulation of stout horny fibres, with main styli, 0.3–0.4 by 0.017 mm., coring, serially-arranged or subplumose, or scattered interstitially; with acanthostyli, 0.17 by 0.014 mm., echinating on fibres and ectosomal skeleton of loose brushes of subtylostyli; microscleres sigmata, 0.014 mm. chord.

Genus *Ophlitaspongia* Bowerbank.

*Ophlitaspongia minor* sp. n.

(Text-fig. 27.)

HOLOTYPE.—B.M. 1936.3.4.609.

OCCURRENCE.—Stn. 89, December 7, 1933, Arabian Sea (19° 14' 00" N., 69° 42' 18" E.), 193 m., bottom sand, shells and rock.



TEXT-FIG. 27.—*Ophlitaspongia minor* sp. n. Styli, of two sizes, and auxiliary subtylostyli,  $\times 200$ , toxa of two sizes, and isochela,  $\times 300$ .

DIAGNOSIS.—Sponge small, stipitate, irregularly branching; surface even, minutely hispid; oscules not apparent; texture firm; colour in spirit, pale cream; skeleton a subsodictyal almost halichondroid, reticulation of tylostyli, with auxiliary subtylostyli mainly in an ectosomal layer; main spicules styli to subtylostyli or even tylostyli, 0.28–0.8 by 0.02–0.032 mm.; auxiliary subtylostyli, 0.32–0.42 by 0.005–0.008 mm.; microscleres isochelæ palmatæ, 0.022 mm. chord, and toxa, 0.045–0.18 mm. chord.

REMARKS.—The species finds its nearest relative in *Echinoclathria hjorti* Arnesen, from the Canaries, which clearly belongs to *Ophlitaspongia*. Indeed, but for the geographical separation I would have accepted the present specimen as a mere variety of Arnesen's species.

KEY TO THE SPECIES OF *Ophlitaspongia*.

1.	{	Microscleres present . . . . .	2
	{	Microscleres absent . . . . .	12
2.	{	Microscleres isochelæ and toxa . . . . .	3
	{	Microscleres toxa only . . . . .	9



3.	{ Largest toxa always less than 0.1 mm. chord . . . . .	4
	{ Largest toxa exceeding 0.1 mm. chord . . . . .	6
4.	{ Isochelæ 0.015 mm. chord or less . . . . .	5
	{ Isochelæ exceeding 0.015 mm. chord . . . . .	<i>arcifera</i>
5.	{ Isochelæ 0.01 mm. chord . . . . .	<i>confragosa</i>
	{ Isochelæ 0.012–0.015 mm. chord . . . . .	<i>californiana</i>
6.	{ Toxa slender and in dragmata . . . . .	<i>thetidis</i>
	{ Toxa stout, strongly curved, not in dragmata . . . . .	7
7.	{ Isochelæ not exceeding 0.016 mm. chord . . . . .	<i>thielei</i>
	{ Isochelæ exceeding 0.016 mm. chord . . . . .	8
8.	{ Fibres cored and echinated by main styli . . . . .	<i>hjorti</i>
	{ Fibres cored mainly by auxiliary subtylostyli . . . . .	<i>rimosa</i>
9.	{ Main megascleres more than 0.3 mm. long . . . . .	<i>basifixa</i>
	{ Main megascleres less than 0.3 mm. long (average) . . . . .	10
10.	{ Toxa more than 0.1 mm. chord . . . . .	<i>pennata</i>
	{ Toxa less than 0.1 mm. chord . . . . .	11
11.	{ Sponge encrusting to massive . . . . .	<i>seriata</i>
	{ Sponge branching . . . . .	<i>subhispidata</i>
12.	{ Sponge massive with tubular oscules . . . . .	<i>tubulosa</i>
	{ Sponge branching or flabellate . . . . .	see note below

*Note.*—There are five species, all described from Australia that are either branching or flabellate, stipitate, and with similar spiculations. They will probably prove, eventually, to be synonymous. These species are :

*O. axinelloides* Dendy.

*O. chalinoides* (Carter).

*O. inornata* Hallmann.

*O. leporina* (Lamarck) (= *O. tenuis* (Carter)).

*O. nodosa* (Carter).

### Genus *Microciona* Bowerbank.

#### *Microciona affinis* Carter.

*Microciona affinis* Carter, 1880 : 41, pl. iv, fig. 15.

**OCCURRENCE.**—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion; Stn. 112, January 15, 1934, Zanzibar Area (5° 04' 57" S., 39° 13' 18" E.), 113 m., bottom coral rock.

**DIAGNOSIS.**—Sponge thinly encrusting; colour, in spirit, white or pale yellow; skeleton of basally-tuberculate styli, 0.14–1.0 by 0.024–0.038 mm., and acanthostyli, 0.1–0.15 by 0.006–0.008 mm., both spicules echinating substratum; auxiliary subtylostyli, basally microspined, 0.3–0.6 by 0.006–0.01 mm.; microscleres isochelæ, 0.012 mm. chord, and toxa, 0.06–0.1 mm. chord, strongly curved and 0.002 mm. thick.

**REMARKS.**—The holotype is represented by a small piece mounted whole and it contains no toxa. The two specimens recorded here agree closely with it in all respects, but in the Zanzibar specimen one toxon was found, and in that from the Arabian coast not more than half a dozen. It seems, therefore, that toxa constitute a scanty but constant part of the skeleton, which may be missing from preparations of small fragments of the sponge.

**DISTRIBUTION.**—Gulf of Manaar.

*Microciona longitoxa* (Hentschel).

*Hymeraphia longitoxa* Hentschel, 1912 : 381, pl. xx, fig. 39.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand and shell.

REMARKS.—The single specimen consists of an irregular lobe, 60 mm. high by 40 by 20 mm. The surface seems to have lost its ectosomal tissues and the present appearance is cerebriform and minutely hirsute. The oscules are small, few in number, and each is the centre of 4 or 5 radiating grooves. The texture is firm but compressible; the colour, in spirit, light brown.

There is sufficient likeness to Hentschel's description to leave no doubt of the identity of the present specimen. It remains therefore to record the few details in which the encrusting holotype and this massive specimen differ. The skeleton consists of a close network of stout spongin fibres, with main styli coring and arranged in a plumose manner, and echinated by acanthostyli. The main styli are almost identical in shape and size with those of the holotype, and there are the same infrequent intermediates between them and the acanthostyli. The latter measure, however, 0.1–0.28 by 0.008–0.02 mm. The auxiliary sybtylostyli are few and measure 0.3 by 0.004 mm., or half the size of those of the holotype. The toxa are typical, except that most of them are nearly 0.8 mm. long, and the chelæ, although typical in form, measure 0.02 as against 0.013 mm.

DISTRIBUTION.—Aru Is. ; 15 m.

*Microciona rhopalophora* (Hentschel).

*Hymeraphia rhopalophora* Hentschel, 1912 : 380, pl. xx, fig. 37.

OCCURRENCE.—Stn. 157, April, 6 1934, Maldive Area ( $4^{\circ} 43' 48''$  N.,  $72^{\circ} 55' 24''$  E. to  $4^{\circ} 44' 00''$  N.,  $72^{\circ} 54' 18''$  E.), 229 m., bottom coral rock.

REMARKS.—A very thin crust contains acanthostyli, singly or in brushes, 0.1–0.45 mm. long, of very similar type to those figured by Hentschel. In addition, there are dermal styli, 0.45 by 0.006 mm. on an average. The larger tylostyli are missing, but there are several incomplete spicules which might well be the remains of such spicules broken in mounting the specimen.

This present specimen is clearly a young one. Throughout the greater part of it the tissues are without spicules, and the dermal styli particularly are sparsely present. The absence (or apparent absence) of the large tylostyli may be due merely to age.

DISTRIBUTION.—Aru Is. ; 16 m.

*Microciona densa* sp. n.

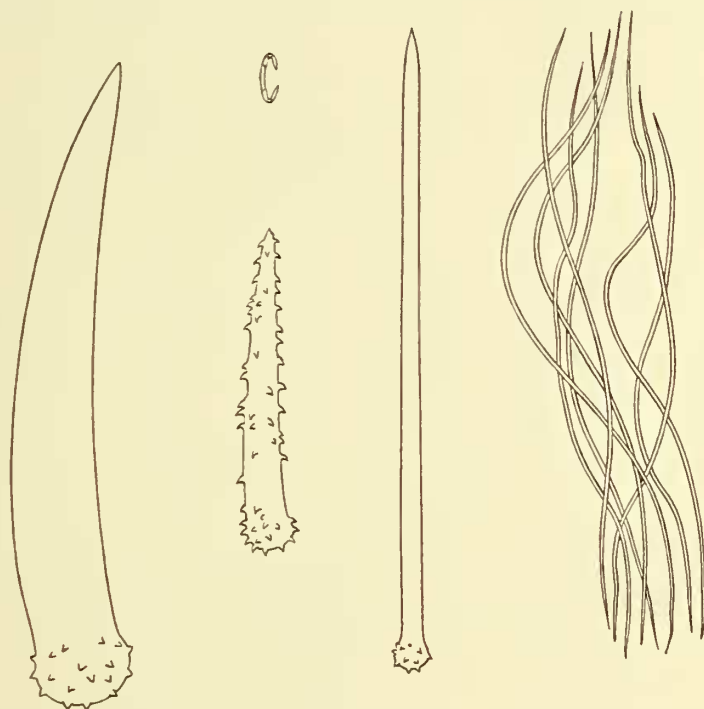
(Text-fig. 28.)

HOLOTYPE.—B.M. 1936.3.4.456.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge massive, lobate; surface sub-cerebriform; oscules minute, scattered; texture firm, incompressible; colour, in spirit, light brown; skeleton of dense columns of styli and acanthostyli arranged in a semi-plumose manner, with aspiculous or

sparingly spiculous spongin connectives; auxiliary spicules subtylostyli, sparingly associated with main skeleton and forming a dense ectosomal layer; main styli smooth or, more commonly, spined basally, very stout, 0.28 by 0.04 mm.; acanthostyli 0.14 by 0.016 mm.; auxiliary subtylostyli, 0.28 by 0.008 mm.; microscleres isochelæ palmatæ, 0.012 mm. chord, and hair-like toxa, usually in wisp-like bundles, 0.28 mm. long.



TEXT-FIG. 28.—*Microciona densa* sp. n. Style, acanthostyle and auxiliary subtylostyle,  $\times 200$ , isochela and wisp-like toxa,  $\times 300$ .

REMARKS.—The holotype consists mainly of two confluent lobes. It is distinguished from all the other species of *Microciona* mainly by the denseness of its skeleton and the robust character of its main megascleres.

*Microciona longistyla* sp. n.

(Text-fig. 29.)

HOLOTYPE.—B.M. 1936.3.4.583.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge small, low-lying and massive; surface hispid; oscules not apparent; texture firm compressible; colour, in spirit, pale yellow; skeleton of plumose columns of styli and tuberculate tylostyli, echinated by acanthostyli, with interstitial and ectosomal subtylostyli; megascleres, 0.32–1.2 by 0.024–0.04 mm. (smaller tylostyli sparingly-spined along shaft as well as basally tuberculate), acanthostyli, 0.06–0.2 by 0.016 mm., interstitial subtylostyli, 0.56 by 0.004 mm., and ectosomal subtylostyli, 0.18 by 0.004 mm.; microscleres isochelæ, 0.016 mm., and toxa, 0.09–0.24 mm. chord.

REMARKS.—The species is characterized, above all, by the size of the tylostyli. The isochelæ are very rare, and it is possible that the few seen may be foreign to the sponge.



TEXT-FIG. 29.—*Microcionia longistyla* sp. n. Style, basally-tuberculate tylostyle, acanthostyle and auxiliary subtylostyli,  $\times 200$ , isochela and toxon,  $\times 300$ .

*Microcionia anonyma* sp. n.

(Text-fig. 30.)

HOLOTYPE.—B.M. 1936.3.4.575.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73–165 m., bottom rack (?).

DIAGNOSIS.—Sponge thinly encrusting; surface even, minutely hispid; oscules not apparent; texture soft; colour, in spirit, pale yellow; skeleton of acanthostyli echinating substratum, with columns of subtylostyli rising from substratum, echinated by large styli or tylostyli, and with ectosomal brushes of smaller subtylostyli; megascleres styli or tylostyli, often basally-spined, 0.36–0.8 by 0.012–0.02 mm., auxiliary subtylostyli 0.36–0.52 by 0.006–0.008 mm., ectosomal subtylostyli, 0.2 by 0.003 mm., and acanthostyli,

0.08 by 0.008 mm. : microscleres toxa, of usual form, 0.04 mm. chord, and hair-like, 0.2–0.4 mm. long.

REMARKS.—The holotype is a small incrustation, mixed up with organic debris and tiny fragments of a *Petrosia* sp. indet. Its characters are ill-defined and its nearest relative is *Microciona longitoxa* Hentschel, which has isochelæ in addition to toxa, and one kind of subtylostyli only.



TEXT-FIG. 30.—*Microciona anonyma* sp. n. All spicules,  $\times 200$ .

Genus *Echinodictyum* Ridley.

*Echinodictyum nervosum* Ridley.

? *Spongia nervosa* Lamarck, 1813 : 450 ; 1816 : 377 ; *Echinodictyum nervosum* Ridley, 1881 : 496, pl. xxviii, figs. 7–10 ; ? *Spongia nervosa* Topsent, 1932 : 114.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—South-east coast of Arabia.

*Echinodictyum jousseaumi* Topsent.

*Echinodictyum jousseaumi* Topsent, 1892 : 24, pl. i, fig. 3 ; Burton, 1931 : 348, pl. xxiii, fig. 7.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea ( $13^{\circ} 35' 30''$  N.,  $42^{\circ} 35' 05''$  E.), 245 m., bottom rock and sand.

DISTRIBUTION.—Red Sea ; Natal.

Genus *Antho* Gray.*Antho tawiensis* (Wilson).

*Lissodendoryx tawiensis* Wilson, 1925 : 432, pl. xlii, fig. 4, pl. xlix, fig. 5.

OCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29' 00" N., 55° 47' 00" E.), 95 m.; Stn. 89, December 7, 1933, northern area of Arabian Sea (19° 14' 00" N., 69° 42' 18" E.), 193 m., bottom sand, shingle and rock.

REMARKS.—The four specimens are small and irregular, but one at least is incipiently cup-shaped. The spiculation of all is fairly typical though styli, smooth or basally-spined, 0.28 by 0.017 mm., are associated with the main skeleton, and the acanthostyli measure 0.16 by 0.014 mm. instead of 0.28–0.35 by 0.005 mm. Embryos are present in some specimens.

It seems that this species is as variable as *Antho involvens* (Schmidt) (see Burton, 1933, pp. 504–508 under *Dictyoclathria beanii* (Bowerbank), a species which must now be known as *Antho involvens*).

DISTRIBUTION.—Philippines.

*Echinoplocamia* gen. n.

GENOTYPE.—*Echinoplocamia arbuscula* sp. n.

DIAGNOSIS.—Clathriinæ with reticulate skeleton of amphitylota and styli echinated by acanthostyli; with auxiliary subtylostyli; microscleres toxa.

*Echinoplocamia arbuscula* sp. n.

(Text-fig. 31.)

HOLOTYPE.—B.M. 1936.3.4.413.

OCURRENCE.—Stn. 177, May 2, 1934, Gulf of Aden (12° 01' 54" N., 50° 39' 12" E.), 366 m., bottom green mud and rock.

DIAGNOSIS.—Sponge ramose; surface hispid; oscules not apparent; texture firm; colour, in spirit, brown; skeleton a reticulation of spongin fibres, with ascending fibres cored by plumosely-arranged styli, often basally-microspined, 0.35–0.9 by 0.018–0.03 mm., connective fibres cored by amphitylota, microspined at each end, 0.24 by 0.035 mm., the whole echinated by acanthostyli, 0.05–0.07 by 0.005–0.007 mm.; auxiliary subtylostyli, basally-microspined, 0.28 by 0.003 mm.; microscleres toxa, up to 0.1 mm. long.

REMARKS.—The holotype is in an unsatisfactory state of preservation, being fragmentary and macerated, 8 mm. long by 4 mm. diameter. The characters of the skeleton are, however, sufficiently striking to justify their description.

Genus *Plocamilla* Topsent.*Plocamilla manaarensis* (Carter).

*Dictyocylindrus manaarensis* Carter, 1880 : 37, pl. iv, fig. 1; *Dirrhopalum manaarensis* Ridley, 1881 : 482; *Plocamia manaarensis* Dendy, 1905 : 179, pl. viii, fig. 1; Burton and Srinivasa Rao, 1932 : 355; *Plocamilla manaarensis* Burton, 1935 : 402; nec *Plocamia manaarensis* Lambe, 1894.

OCURRENCE.—Stn. 89, December 7, 1933, northern area of Arabian Sea (19° 14' 00" N., 69° 42' 18" E.), 193 m., bottom sand, shingle and rock.

REMARKS.—A small branching specimen 20 mm. high.

DISTRIBUTION.—West coast of India ; Ceylon ; Laccadives ; 41–57 m.

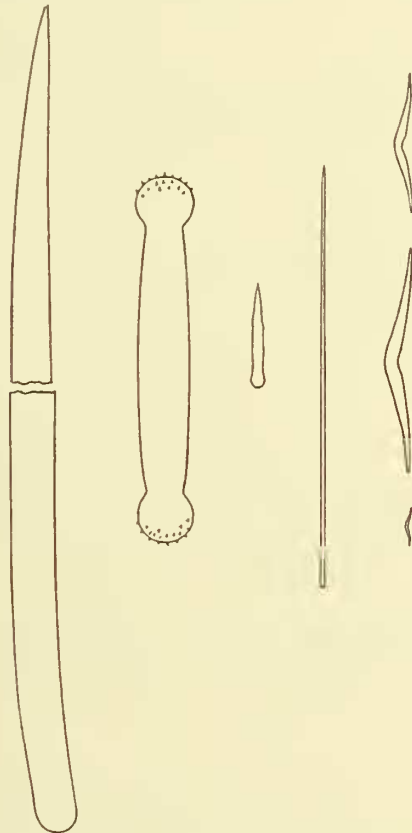
Genus *Acarnus* Gray.

*Acarnus topsenti* Dendy.

*Acarnus topsenti* Dendy, 1921 : 98, pl. iv, fig. 3, pl. xv, fig. 8.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Indian Ocean (Cargados Carajos) ; 55–165 m.



TEXT-FIG. 31.—*Echinoplocamia arbuscula* sp. n. Style, amphitylote, acanthostyle and auxiliary subtylote,  $\times 200$ , toxa,  $\times 300$ .

Sub-family RASPELIINÆ.

Genus *Aulospongius* Norman.

*Aulospongius tubulatus* (Bowerbank).

*Haliphysema tubulatus* Bowerbank, 1873 : 29, pl. vii ; *Aulospongius tubulatus* Norman, 1878 : 267 ; Dendy, 1889 : 89, pl. v, fig. 11 ; Dendy, 1921 : 61.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E., to 11° 56' 42" N., 50° 39' 12" E.), 37 m., bottom sand and shells ; Stn. 53, November 2.

1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle and Lithothamnion.

DISTRIBUTION.—Ceylon; Amirantes; 51–53 m.

Genus *Rhabderemia* Topsent.

*Rhabderemia indica* Dendy.

*Rhabderemia indica* Dendy, 1905: 180, pl. xii, fig. 10.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells; Stn. 209, May 17, 1934, Red Sea ( $15^{\circ} 54' 36''$  N.,  $41^{\circ} 13' 00''$  E.), 366 m., bottom green and brown mud and rock.

DISTRIBUTION.—Ceylon.

Genus *Endectyon* Topsent.

*Endectyon thurstoni* (Dendy).

*Raspailia thurstoni* Dendy, 1887: 161, pl. xii, fig. 1; *Hemectyon thurstoni* Burton and Rao, 1932: 347.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—India (Cape Cormorin, Madras, Tuticorin); 70 m.

*Hemectyonilla* gen. n.

GENOTYPE.—*Stylostichon involutum* Kirkpatrick 1903: 250, pl. v, fig. 6, pl. vi, fig. 17.

DIAGNOSIS.—Raspelliinæ with skeleton of plumose columns of large and small rhabdostyli; and with slender oxea (styloids?), more rarely styli, occurring interstitially to columns and in ectosomal brushes; microscleres absent.

*Hemectyonilla involutum* (Kirkpatrick).

*Stylostichon involutum* Kirkpatrick, 1903: 250, pl. v, fig. 16, pl. vi, fig. 17; *Plumohalichondria gardineri* Dendy, 1921: 87, pl. ii, fig. 9, pl. xv, fig. 4.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells; Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand and shell; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion; Stn. 185, May 5, 1934, Gulf of Aden ( $13^{\circ} 48' 06''$  N.,  $49^{\circ} 16' 48''$  E. to  $13^{\circ} 48' 36''$  E.,  $49^{\circ} 16' 24''$  E.), 2001 m.

DISTRIBUTION.—Natal; Amirante; 37–80 m., bottom broken shells.

Genus *Higginsia* Higgin.

*Higginsia petrosioides* Dendy.

*Higginsia petrosioides* Dendy, 1921: 126, pl. vii, fig. 9, pl. xvii, fig. 7.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.



REMARKS.—There are 50 specimens all closely similar in external form and spiculation. They are massive and rounded, with surface mainly papillate. In places the surface may be apparently smooth, but closer examination shows, even here, incipient papillæ. The oscules are small, few and scattered, about 1 mm. diameter, and the summit of each papilla bears a pore, presumably inhalant. The colour, in all, is yellow.

Apart from the main oxea being slightly thicker, up to 0.05 mm., the skeleton differs in no respect from that of the holotype except that in all but one specimen the acanthoxea form a distinct ectosomal layer, as well as being scattered in the choanosome.

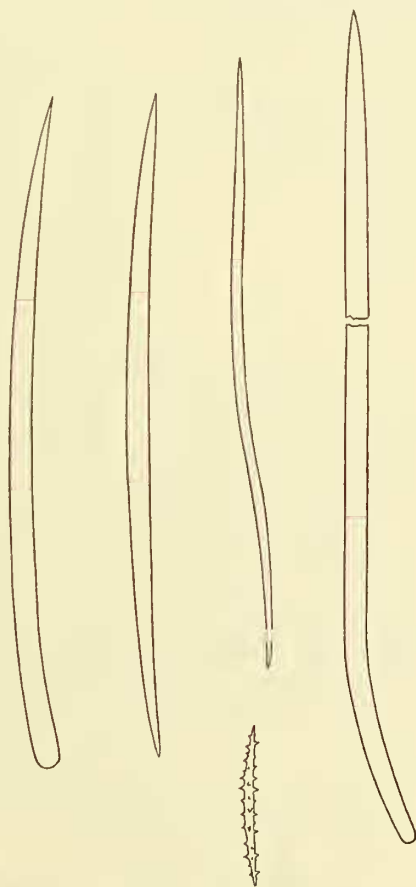
DISTRIBUTION.—Indian Ocean (Seychelles, 80 m.).

*Higginsia robusta* sp. n.

(Text-fig. 32.)

HOLOTYPE.—B.M. 1936.3.4.342.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells; Stn. 35, October 16, 1933,



TEXT-FIG. 32.—*Higginsia robusta* sp. n. Styli, oxeote and styloid,  $\times 100$ , acanthoxeote,  $\times 300$ .

Gulf of Aden ( $13^{\circ} 14' 24''$  N.,  $46^{\circ} 14' 12''$  E. to  $13^{\circ} 13' 24''$  N.,  $46^{\circ} 10' 00''$  E.), 441 m., bottom green mud, sand and shingle; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N. to  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge ranging from clavate to stipitate, when small, to branching or flabellate in large specimens; surface papillose; oscules not apparent; texture firm;

colour, in spirit, yellow to yellowish-green; skeleton in small specimens of dense ascending plumose columns of styli, sometimes modified to oxea, in larger specimens of a dense axial concentration with longer styli radiating to surface; megascleres styli or oxea, 0.3–0.88 by 0.016–0.032 mm., longer styli, 1.4–2.0 mm., scattered irregularly among spicules of main skeleton, and styloids with ends oxeote, rarely bidentate, in ectosomal brushes or interstitial to main skeleton, 0.48–0.8 by 0.004–0.014 mm.; microscleres acanthoxea, chiefly in ectosomal layer, 0.05–0.07 mm. long.

REMARKS.—The dozen specimens are obviously conspecific but whereas in the majority the main skeleton is composed almost entirely of styli there is much variation, the larger specimens having a mixture of styli and oxea, with in one case the oxea predominating.

The present specimens are related to *H. mixta* (Hentschel) but differ in the smaller size of the acanthoxea.

KEY TO THE SPECIES OF *Higginisia*.

- |    |   |                                                                                            |                     |
|----|---|--------------------------------------------------------------------------------------------|---------------------|
| 1. | { | Main megascleres seldom exceeding 0.9 mm. in length . . . . .                              | 2                   |
|    | { | Main megascleres seldom less than 1.0 mm. long . . . . .                                   | <i>papillosa</i>    |
| 2. | { | With long slender styli included in main skeleton . . . . .                                | 3                   |
|    | { | Without long slender styli . . . . .                                                       | <i>petrosioides</i> |
| 3. | { | With ectosomal styloids mainly oxeote, rarely stylote, and very rarely bidentate . . . . . | 4                   |
|    | { | With ectosomal styloids bidentate at one end . . . . .                                     | <i>bidentifera</i>  |
| 4. | { | Main megascleres up to 0.032 mm. thick . . . . .                                           | 5                   |
|    | { | Main megascleres up to 0.021 mm. thick . . . . .                                           | <i>coralloides</i>  |
| 5. | { | Surface of sponge strongly hispid . . . . .                                                | <i>mixta</i>        |
|    | { | Surface of sponge papillose, non-hispid . . . . .                                          | <i>robusta</i>      |

*Raspailopsis* gen. n.

GENOTYPE.—*Raspailopsis cervicornis* sp. n.

DIAGNOSIS.—Corticate Raspeliinæ with axial skeleton of large and small styli embedded in spongin fibres, an extra axial skeleton of small styli and brushes of pseudoxea, each such brush having one long style at its centre; microscleres absent.

REMARKS.—A second species should be placed in this genus, namely, *Raspailia* (*Syringella*) *nuda* Hentschel (1909, p. 383), in which the positions of the short styli and pseudoxea are reversed. Otherwise, the two species are very alike.

Neither of these species is typical of the sub-family Raspeliinæ but the ectosomal brushes with long styli set at their centres is indicative of their affinities.

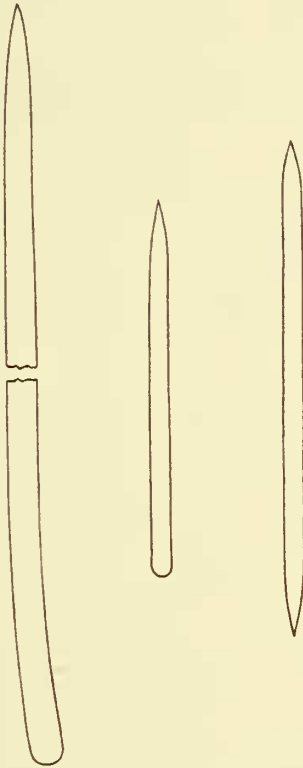
*Raspailopsis cervicornis* sp. n.

(Text-fig. 33.)

HOLOTYPE.—B.M. 1936.3.4.604.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E. to 11° 56' 24" N., 50° 39' 12" E.), 37 m., bottom sand and shells; Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion; Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion; Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73–165 m.

DIAGNOSIS.—Sponge erect, stipitate, dichotomously branched or caliculate; surface even, strongly hispid; oscules not apparent; texture firm, incompressible; colour, in spirit, dark grey; spicules large styli, base sometimes slightly tylote, 1.6–3.0 by 0.032–0.05 mm., small styli, 0.5 by 0.024 mm., and tornotiform pseudoxea, 0.66 by 0.028 mm.



TEXT-FIG. 33.—*Raspailopsis cervicornis* sp. n. Styli, of two sizes, and tornotiform pseudoxote,  $\times 100$ .

### Family AXINELLIDÆ.

#### Genus *Amorphinopsis* Carter.

*Amorphinopsis* Carter, 1887 : 77; *Dactylella* Thiele, 1898 : 55; *Trachyopsis* Dendy, 1905 : 147; *Migas* Sollas, 1908 : 395; *Dactylella* Annandale, 1915 : 470, nec *Dactylella* Gray.

GENOTYPE.—*Amorphinopsis excavans* Carter, 1887 : 77.

DIAGNOSIS.—Axinellidæ with skeleton of oxea, variable in size, arranged loosely, without order or in loose fibres running to surface and projecting beyond; without special ectosomal skeleton.

#### *Amorphinopsis megalorrhaphis* (Carter).

*Amorphina megalorrhaphis* Carter, 1881 : 368; *A. megalorrhaphis* Ridley, 1884 : 416; *Halichondria solida* Ridley and Dendy, 1886 : 326; *Amorphinopsis excavans* Carter, 1887 : 77, pl. v, figs. 12–15; *Halichondria solida* Ridley and Dendy, 1887 : 4, pl. ii, fig. 5; *H. solida*, var. *rugosa* Ridley and Dendy, 1887 : 4; *H. panicea*, var. Dendy, 1887 : 157; *H. granulata* Keller, 1891 : 310, pl. xvi, fig. 8; *H. tuberculata* Keller, 1891 : 310, pl. xvi, fig. 10; *H. panicea*, var. *rameswarans* Thurston, 1895 : 102–105; *H. variabilis* Lindgren, 1897 : 480; *H. armata* Lindgren, 1897 : 480; *H. dura* Lindgren, 1897 : 480; *H. cavernosa* Topsent, 1897 : 477, pl. xix, fig. 16; *H. variabilis* Lindgren, 1898 : 3, pl. xviii, fig. 1, pl. xix, fig. 1; *H. armata* Lindgren, 1898 : 3, pl. xvii, fig. 1, pl. xix, fig. 2; *H. dura*

Lindgren, 1898 : 4, pl. xvii, fig. 2, pl. xix, fig. 3; *Dactylella hilgendorfi* Thiele, 1898 : 56, pl. v, fig. 25, pl. iv, fig. 8, pl. viii, fig. 41; *H. solida* Kirkpatrick, 1900 : 139; *H. solida*, var. *rugosa* Kirkpatrick, 1900 : 139; *H. panicea*, var. *megalorhaphis*, Dendy, 1905 : 146; *H. panicea*, var. *hemispherica* Dendy, 1905 : 146; *Trachyopsis halichondrioides* Dendy, 1905 : 147, pl. x, fig. 10; *Halichondria papillata* Baer, 1906 : 11, pl. i, fig. 5, pl. iv, figs. 7-9; *Migas porphyron* Sollas, 1908 : 395; *Trachyopsis halichondrioides* Row, 1911 : 321; *Halichondria variabilis* Hentschel, 1912 : 408; *Spongosorites* sp. Sewell, 1913 : 346; *Amorphinopsis excavans* Annandale, 1915 : 467; fig. 4A; *A. excavans*, var. *digitifera* Annandale, 1915 : 469, figs. 4B, 5; *Halichondria panicea* Dendy, 1921 : 37; *H. aplysinoides* Dendy, 1921 : 39, pl. iii, figs. 3-5, pl. xii, fig. 9; *H. panicea* Wilson, 1925 : 394; *H. variabilis* Wilson, 1925 : 396; *Trachyopsis halichondrioides* Wilson, 1925 : 409; Burton, 1926 : 75, figs. 6-7.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29' 00" N., 55° 47' 00" E.), 95 m.; Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion; Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shell, Lithothamnion; Stn. 111, January 14, 1934, Zanzibar Area (5° 04' 18" S., 39° 14' 12" E.), 73-165 m.

REMARKS.—Attention has already been drawn (Burton, 1926) to the variation in the skeleton of specimens from the Suez Canal, identified under *Trachyopsis halichondrioides*, and it is my experience that there is here a species, recorded under a variety of names, which occupies in the Indian Ocean and Indo-Pacific the position held by *Halichondria panicea* in the northern hemisphere. The specimens represented in the synonymy list given here have certain features in common, and the differences between them are no more than the differences found over a wide range of *H. panicea*, from which the present species differs most markedly in the absence of a special ectosomal skeleton.

One specimen in the present collection is a subcylindrical fragment, 30 by 10 mm., whitish, with an irregular, subaculeate surface and a single small oscule, 1 mm. diameter, towards one end. The skeleton is an irregular reticulation of oxea, in which the spicules run more or less vertical to the surface. The oxea measure 1.2 by 0.03 to 2.0 by 0.08 mm., the majority being of the larger size. The specimen is included in this species with some hesitation since the oxea are rather thicker than usual.

DISTRIBUTION.—The Indian Ocean generally, eastwards to Formosa, the Philippines, and New Hebrides and southwards to Australia (Torres Straits and Bass Straits): littoral to 183 m.

#### Genus *Axinella* Schmidt.

#### *Axinella carteri* (Dendy).

*Acanthella carteri* Dendy, 1889 : 93, pl. iv, fig. 6; *A. aurantiaca* Keller, 1889 : 396, pl. xxiv, fig. 47; *A. carteri* Dendy, 1905 : 193, pl. viii, fig. 6; *A. aurantiaca* Topsent, 1906 : 562; Row, 1911 : 356; *A. carteri* Dendy, 1921 : 119, pl. v, fig. 5.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shell and Lithothamnion.

REMARKS.—The single specimen is flabellate, 12 cm. high by 12 cm. across, resembling closely the type of *Acanthella aurantiaca*. The spicules are styli 0.4 mm. long.

In the original description of *A. carteri*, Dendy mentioned the presence of a second category of styli, long and slender, lying between the main fibres of the skeleton. It seems that the occurrence of these spicules is sporadic, and the fact that they have not been found in the present specimen need not invalidate its being identified with Dendy's species.

DISTRIBUTION.—Red Sea ; Indian Ocean (Gulf of Manaar, Cargados Carajos, Diego Garcia, Amirante, Salomon, Seychelles) ; 7–80 m.

*Axinella lamellata* (Dendy).

*Spongosorites lamellata* Dendy, 1905 : 184, pl. xii, fig. 2.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

REMARKS.—The 26 specimens, ranging from 5 to 10 cm. high, have a stronger outward resemblance to *Axinella* (*Ceratopsis*) *ramosa* (Thiele) than *A. lamellata*. In fact, the only reason for separating these two species seems to lie in the size of their megascleres, which are 0.7–1.4 mm. long in Thiele's species and 0.95 mm. in Dendy's. In the present specimens, on the other hand, they rarely exceed 0.5 mm. in length.

DISTRIBUTION.—Ceylon.

*Aximella agariciformis* (Dendy).

*Thrinacophora agariciformis* Dendy, 1905 : 186, pl. xii, fig. 6 ; *Dragmacidon agariciformis* Hallmann, 1917 : 639.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Ceylon.

*Axinella durissima* (Dendy).

*Thrinacophora durissima* Dendy, 1905 : 187, pl. xii, fig. 5 ; *Sigmaxinella durissima* Dendy, 1921 : 113 ; *S. durissima*, var. *massalis* Dendy, 1921 : 113, pl. v, fig. 4, pl. vii, fig. 4 ; *S. durissima*, var. *erecta* Dendy, 1921 : 113, pl. vii, fig. 5 ; *S. durissima*, var. *tethyoides* Dendy, 1921 : 114, pl. vii, fig. 6.

OCCURRENCE.—Stn. M.B. I (c), September 17, 1933, Red Sea ( $13^{\circ} 39' 30''$  N.,  $42^{\circ} 43' 00''$  E.), 26 m., bottom coral rock ; Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 112, January 15, 1933, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

OCCURRENCE.—Indian Ocean (Providence, Amirante, Saya de Malha, Seychelles, Ceylon) ; 54–143 m.

*Axinella conulosa* (Dendy).

*Phakellia conulosa* Dendy, 1921 : 116, pl. vi, fig. 4, pl. xvii, fig. 2 ; *P. conulosa*, var. *mauritiana* Dendy, 1921 : 117, pl. vi, fig. 5.

OCCURRENCE.—Stn. 112, January 15, 1933, Zanzibar Area ( $5^{\circ} 04' 57''$  N.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

DISTRIBUTION.—Indian Ocean (Mauritius, Cargados Carajos) ; 55–183 m.

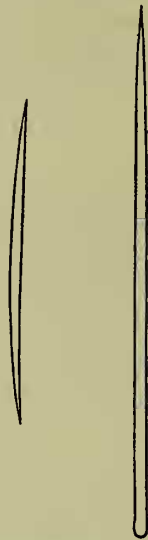
*Axinella bidderi* sp. n.

(Text-fig. 34.)

HOLOTYPE.—B.M. 1936.3.4.316.

OCCURRENCE.—Stn. 35, October 16, 1933, Gulf of Aden ( $13^{\circ} 14' 24''$  N.,  $46^{\circ} 14' 12''$  E. to  $13^{\circ} 13' 24''$  N.,  $46^{\circ} 10' 00''$  E.), 441 m., bottom green mud, sand and shells; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion; Stn. 54, November 3, 1933, South Arabian Coast ( $21^{\circ} 50' 00''$  N.,  $59^{\circ} 52' 00''$  E.), 1046 m., bottom green mud.

DIAGNOSIS.—Sponge flabellate, stipitate; surface even, minutely hispid; oscules not apparent; texture firm, flexible; colour, in spirit, brown to reddish-brown; skeleton an

TEXT-FIG. 34.—*Axinella bidderi* sp. n. Oxeote and style,  $\times 100$ .

irregular reticulation of ascending, subplumose fibres, with (mainly) unispicular connectives; megascleres oxea, 0.35–0.48 by 0.007–0.024 mm., and styli, 0.35–0.96 by 0.007–0.024 mm.; microscleres trichodragmata, of occasional occurrence, possibly.

SYSTEMATIC NOTES.—In the specimen from Stn. 35, and in one specimen from Stn. 45, the oxea and styli are of about equal length, 0.35–0.48 mm., but in the second specimen from Stn. 45, otherwise agreeing in all respects with the first two, the styli occasionally measure up to 0.96 mm. long, and there are, in addition trichodragmata.

From Stn. 54 there is an encrusting specimen growing on a worm-tube which agrees closely with the specimen from Stn. 45 except in external form.

*Axinella ventilabrum* sp. n.

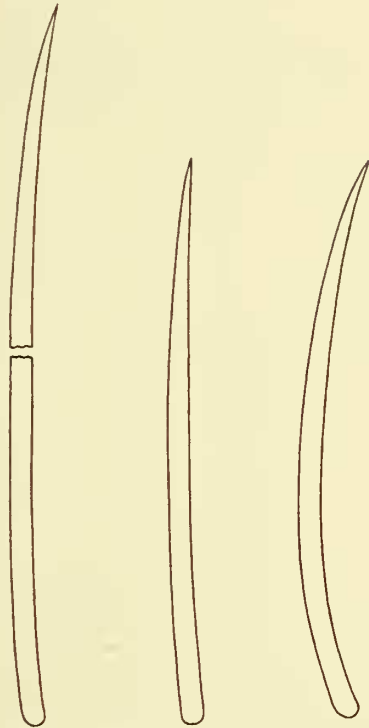
(Text-fig. 35.)

HOLOTYPE.—B.M. 1936.3.4.315.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  N.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge flabellate, substipitate; surface uneven, minutely hispid, prominently marked by a dendritic system of raised ridges (representing an internal system

of skeleton bundles running from base to apex of sponge); oscules not apparent; texture firm, flexible; colour, in spirit, pale yellowish-brown; skeleton a dense, confused reticulation of styli of two sizes (in dendritic systems of fibres, spicules are even more densely packed); megascleres styli, of two sizes, 1.6 by 0.032 and 0.8 by 0.032 mm. respectively; microscleres absent.



TEXT-FIG. 35.—*Axinella ventilabrum* sp. n. Styli, of two sizes,  $\times 100$ .

*Axinella flabello-reticulata* sp. n.

(Text-fig. 36.)

HOLOTYPE.—B.M. 1936.3.4.325.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  N.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge flabellate (to subcaliculate?), substipitate; inner surface even, outer surface marked with a reticulation of ridges, both surfaces minutely hispid; oscules not apparent; texture firm, flexible; colour, in spirit, pale brownish-yellow; skeleton an irregular reticulation, mainly multispicular (2–6 spicules), of styli, sharply bent in basal third, 0.6 by 0.04 mm.; microscleres absent.

*Axinella dragmazioides* sp. n.

(Text-fig. 37.)

HOLOTYPE.—B.M. 1936.3.4.319.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge calciculate, rarely flabellate; surface even, minutely hispid, outer surface of cup often marked by a number of low, rounded mounds; oscules not apparent; texture firm, flexible; colour, in spirit, pale yellow to brown; skeleton a dense irregular unispicular reticulation; megascleres styli, 1.1 by 0.04 mm.; microscleres absent.



TEXT-FIG. 36.—*Axinella flabelloreticulata* sp. n. Style,  $\times 100$ .

TEXT-FIG. 37.—*Axinella dragmaxioides* sp. n. Style,  $\times 100$ .

TEXT-FIG. 38.—*Axinella massalis* sp. n. Style and microxeote,  $\times 100$ .

*Axinella massalis* sp. n.

(Text-fig. 38.)

HOLOTYPE.—B.M. 1936.3.4.509.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge irregularly massive; surface uneven, hispid, harsh to touch; oscules few, small, scattered; texture firm, barely compressible; colour, in spirit, ash grey to dark brown; skeleton an irregular reticulation of styli, 0.45–0.64 by 0.03–0.044 mm., with microxea, 0.24 by 0.006–0.012 mm. and trichodragmata, 0.036 mm. long, scattered interstitially.

REMARKS.—The species varies from the known species of *Axinella* bearing microxea and trichodragmata in its external form as well as in details of its spiculation.



Genus *Phakellia* Bowerbank.*Phakellia radiata* (Dendy).

*Axinella mastigophora* Lindgren, 1897 : 483 ; Lindgren, 1898 : 32, pl. xvii, fig. 6, pl. xix, fig. 20 ; *Bubaris radiata* Dendy, 1916 : 131, pl. i, fig. 8, pl. iv, fig. 24 ; *B. conulifera* Dendy, 1921 : 62, pl. vii, fig. 3, pl. xiii, fig. 2 ; Burton, 1928 : 130 ; *B. columnata* Burton, 1928 : 130, pl. ii, fig. 1 ; *nec Axinella mastigophora* Schmidt.

OCCURRENCE.—Stn. 9, September 17, 1933, Red Sea ( $13^{\circ} 35' 30''$  N.,  $42^{\circ} 35' 05''$  E.), 245 m., bottom rock and sand ; Stn. 27, October 12, 1933, Gulf of Aden ( $11^{\circ} 57' 12''$  N.,  $50^{\circ} 35' 00''$  E. to  $11^{\circ} 56' 42''$  N.,  $50^{\circ} 39' 12''$  E.), 37 m., bottom sand and shells ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 89, December 7, 1933, Northern Area of Arabian Sea ( $19^{\circ} 14' 00''$  N.,  $69^{\circ} 42' 18''$  E.), 193 m., bottom sand, shells and rock ; Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), (73–165 m.) ; Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

REMARKS.—There is, in the Indo-Pacific area, a group of species which certainly belong to the genus *Phakellia* and probably constitute a single species. Their common characteristic is a skeleton composed of plumose columns of styli of two sizes with their bases implanted in an axial core of short strongyla. The group includes *Axinella mastigophora* Lindgren (*nec* Schmidt), *Bubaris radiata* and *B. conulifera*, both of Dendy, and *B. columnata* Burton. If these can be accepted as a single species, as seems likely, then the specimen from Stn. 27 must be included with them. It has the external form of *B. columnata*, with the axial spicules slightly vermiform as in *Axinella mastigophora* Lindgren ; but although the dimensions of the various spicule categories, and the shape of the styli, are in accord with those of the rest of this group, the axial spicules are bluntly-ended oxea instead of strongyla.

A specimen from Stn. 112 is thinly flabellate, very like *Bubaris columnata* except that the longitudinal ridges are very few in number and ill-defined. The spiculation is, however, typical except that the axial spicules are oxea instead of strongyla.

From Stn. 89 there comes a small, thinly encrusting specimen, bearing isolated, erect processes. The skeleton consists of a basal layer of oxea and strongyla, and two categories of styli with their bases implanted therein. The erect processes have an axial core of, mainly, strongyla with some oxea, and radially-arranged styli. The skeleton of the basal mass and that of the processes is markedly different. The strongyla (with some oxea) of the processes are up to 0.8 mm. long and are bent in the middle ; the oxea (with some strongyla) of the basal mass rarely exceed 0.4 mm. long and are often slightly vermiform. The large styli of the processes sometimes attain a length of 3 mm.

In addition there are 8 other specimens from Stns. 9, 45, 111 and 112, all of which are typical of *Bubaris radiata* (*sensu stricto*). Two are 20 and 25 mm. high respectively, both columnar, the first dividing into two and the second into three digitate processes at the apex. The remaining six specimens are globular or subglobular, 5–45 mm. high.

DISTRIBUTION.—Indian Ocean (Okhamandal coast, Providence, Andamans) ; Pacific (Straits of Formosa) ; 71–165 m.

Genus *Hymeniacidon* Bowerbank.*Hymeniacidon virgultosa* (Carter).

*Axinella virgultosa* Carter, 1887 : 68, pl. v, fig. 11 ; Dendy, 1916 : 118.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E. to 11° 56' 42" N., 50° 39' 12" E.), 37 m., bottom shells and sand ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Indian Ocean (Okhamandal, Mergui Archipelago) ; 27–31 m.

*Hymeniacidon variospiculata* Dendy.

*Hymeniacidon variospiculata* Dendy, 1921 : 122, pl. xvii, fig. 4.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Salomon ; 137 m.

Genus *Ciocalypta* Bowerbank.*Ciocalypta penicillus* Bowerbank.

*Spongia cavernosa* Lamarck, 1813 : 371 ; Lamarck, 1816 : 353 ; *Ciocalypta penicillus* Bowerbank, 1864 : 180, pl. xxx, fig. 360 ; Bowerbank, 1866 : 81 ; Gray, 1867 : 522 ; *Axinella penicillus* Schmidt, 1870 : 76 ; *Ciocalypta tyleri* Bowerbank, 1873 : 21, pl. iv, figs. 9–12 ; *C. penicillus* Bowerbank, 1874 : 33, pl. xiii, figs. 2–4 ; *C. leei* Bowerbank, 1874 : 255, pl. lxxxvi, figs. 1–4 ; *C. penicillus*, var. *tuberculata* Carter, 1876 : 235 ; *C. penicillus* Ridley, 1881 : 116 ; *C. leei* Ridley, 1881 : 116 ; *C. penicillus* Bowerbank, 1882 : 38 ; *C. leei* Bowerbank, 1882 : 38 ; *Leucophlœus massalis* Carter, 1883 : 323, pl. xiv, fig. 15 ; *Ciocalypta penicillus*, var. *aciculata* Carter, 1885 : 366 ; *Leucophlœa massalis* Carter, 1885 : 366 ; *Ciocalypta tyleri* Carter, 1885 : 366 ; ? *Stylotella polymastia* Lendenfeld, 1888 : 186, pl. iv, fig. 1 ; *Ciocalypta penicillus* Topsent, 1888 : 140 ; *C. tyleri*, var. *manaarensis* Dendy, 1889 : 91 ; *Apatospongia fallax* Marshall, 1892 : 16, pl. viii, figs. 1–5 ; *C. penicillus* Marshall, 1897 : 238 ; *C. tyleri* Marshall, 1897 : 239 ; *C. penicillus*, var. *gracilis* Topsent, 1897 : 445, pl. xviii, figs. 6–7 ; *Apathospongia fallax* Delage, 1899 : 172 ; *Ciocalypta tyleri* Dendy, 1905 : 197 ; ? *C. tyleri*, var. *aberrans* Dendy, 1905 : 198 ; ? *C. tyleri* Row, 1911 : 359 ; Hentschel, 1912 : 422 ; *C. melichlora* Hentschel, 1912 : 423 ; *C. rutila*, var. *gracilis* Hentschel, 1912 : 423 ; *C. heterostyla* Hentschel, 1912 : 424, pl. xiv, fig. 3, pl. xxi, fig. 58 ; *C. mertoni* Hentschel, 1912 : 424, pl. xiv, fig. 4, pl. xxi, fig. 59 ; ? *C. stalagmites* Hentschel, 1912 : 426, pl. xxi, fig. 60 ; ? *C. oculata*, var. *maxima* Hentschel, 1912 : 428, pl. xxi, fig. 61 ; ? *Leucophlœus incrustans* Ferrer, 1912 : 17 ; ? *Ciocalypta polymastia* Hallmann, 1914 : 353, fig. 7 ; *C. weltneri* Arnesen, 1920 : 24, pl. ii, fig. 7, pl. v, fig. 1 ; *C. penicillus* Topsent, 1921 : 687 ; *C. penicillus*, var. *dendyi* Topsent, 1921 : 690 ; *C. penicillus* Ferrer, 1922 : 2 ; Topsent, 1925 : 635 ; Arndt, 1928 : 54, figs. 60–61 ; Topsent, 1930 : 13 ; *C. alleni* de Laubenfels, 1936 : 134 ; *nec Spongia cavernosa* Pallas.

OCCURRENCE.—Stn. 161, April 8, 1934, Maldive Area (5° 04' 48" N., 72° 50' 30" E.), 46 m., bottom coarse sand.

REMARKS.—A few fragmentary fistulæ occur, with oxea only for spicules.

DISTRIBUTION.—Coasts of Europe (from southern England to Spain and Portugal) ; Mediterranean ; Canaries ; South Africa ; Red Sea ; Ceylon ; Indo-Pacific ; Australia ; New Zealand ; 6–40 m.

Genus *Collocalypta* Dendy.

*Collocalypta digitata* Dendy.

*Collocalypta digitata* Dendy, 1905 : 199, pl. vii, fig. 6, pl. xiii, figs. 1-2.

OCCURRENCE.—Stn. 112, January 15, 1933, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom rock and coral.

DISTRIBUTION.—Gulf of Manaar.

Genus *Sigmaxinella* Dendy.

*Sigmaxinella megastyla* sp. n.

(Text-fig. 39.)

HOLOTYPE.—B.M. 1936.3.4.536.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73-220 m., bottom coarse sand, shells and (?) rock.



TEXT-FIG. 39.—*Sigmaxinella massalis* sp. n. Style  $\times 100$ , trichites, of two sizes, and sigma,  $\times 600$ .

DIAGNOSIS.—Sponge massively digitate; surface strongly hispid, harsh to touch; oscules not apparent; texture firm, slightly compressible; colour, in spirit, pale yellow; skeleton of loose plumose columns of styli running from centre of lobe to surface; mega-

scleres styli, usually slightly curved in basal third, 1.0 by 0.07 mm. ; microscleres sigmata, 0.06–0.08 mm. chord, and trichites, scattered, of two sizes, 0.1 and 0.4 mm. long.

REMARKS.—The holotype was either moribund when taken or has macerated since and is not in a good condition for accurate description. The microscleres are numerous, distributed generally through the tissues, but more especially at the surface ; and throughout their occurrence is patchy. It could be that they represent foreign inclusions and that the sponge belongs to *Axinella*, but after due consideration it is assumed that the microscleres are proper to this specimen and that it represents a new species of *Sigmaxinella* characterized by the large size of the styli.

Genus *Stylissa* Hallmann.

*Stylissa massa* (Carter).

*Axinella virgultosa*, var. *massa* Carter, 1887 : 68, pl. vii, figs. 6–7 ; *Stylotella conulosa* Topsent, 1897 : 466 ; *Hymeniacion conulosa* Lindgren, 1897 : 483 ; Lindgren, 1898 : 31, pl. xvii, fig. 13, pl. xix, fig. 19 ; ?*Suberites mollis* Kieschnick, 1898 : 46 ; Kieschnick, 1900 : 576, pl. xlv, fig. 4.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—Mergui Archipelago ; Amboina ; Java ; ? Ternate.

*Stylissa coccinea* (Keller).

*Reniera coccinea* Keller, 1891 : 307, pl. xvi, figs. 5–6 ; *Hymeniacion coccinea* Burton, 1926 : 81.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

REMARKS.—The single typical specimen contains no sigmaspiroids (cf. Burton, l.c.). Embryos are present.

DISTRIBUTION.—Red Sea ; Suez Canal.

Genus *Ptilocaulis* Carter.

*Ptilocaulis spiculifera* (Lamarck).

*Spongia spiculifera* Lamarck, 1813 : 449 ; Lamarck, 1816 : 376 ; *Ptilocaulis gracilis* Carter, 1883 : 321, pl. xiii, fig. 8, pl. xiv, fig. 13 ; *Axinella spiculifera* Ridley, 1884 : 617, pl. liv, fig. b ; Dendy, 1921 : 115, pl. viii, fig. 7 ; *Ptilocaulis digitatus* Topsent, 1928 : 172, pl. ii, fig. 52, pl. vi, fig. 15 ; *P. digitatus*, var. *spiculifera*, Topsent, 1932 : 111, pl. v, fig. 8 ; *P. spiculifer* Topsent, 1933 : 23.

OCCURRENCE.—Stn. 151, April 3, 1934, Maldive Area (4° 50' 00" N., 72° 50' 12" E.), 101 m., bottom coral rock.

DISTRIBUTION.—West Indies ; Cape Verde Is. ; Indian Ocean (Amirante) ; Australia (King Island) ; 40–52 m.

Genus *Raspaigella* Schmidt.

*Raspaigella salomonensis* (Dendy).

*Spongosorites salomonensis* Dendy, 1921 : 125, pl. xvii, fig. 6.

OCCURRENCE.—Stn. 112, January 15, 1933, Zanzibar Area (5° 04' 57" S., 39° 13' 18" E.), 113 m., bottom coral rock.

DISTRIBUTION.—Salomon ; 110–219 m.

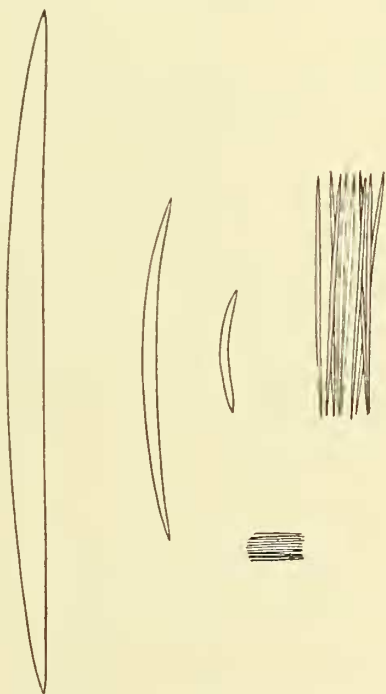
*Raspaigella ? suluensis* (Wilson).

*Spongisorites suluensis* Wilson, 1925 : 331, pl. xxxviii, fig. 8, pl. xlvi, fig. 3.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

REMARKS.—A small irregular, massive sponge about 2 cm. across is referred doubtfully to this species. The ectosome is lacking entirely, and the interstices of the sponge contain sufficient calcareous debris to suggest that it has been subject to wave action on the bottom of the sea. The spicules are large oxea and frequent styli, average 1.0 by 0.048 mm., small oxea, average 0.24 by 0.012 mm. long, and trichodragmata. The last-named are abundant and measure 0.012, 0.028, 0.04 and 0.12 mm. (with, possibly, intermediates between these sizes). It would be inadvisable to refer so incomplete a specimen to a new species and its nearest relative is *Spongisorites suluensis*, which contains "not very abundant" trichodragmata 0.1 mm. long. Otherwise there is a fairly close agreement.

DISTRIBUTION.—Philippines.



TEXT-FIG. 40.—*Raspaigella dendyi* sp. n. Oxea, of three sizes,  $\times 100$ , trichodragmata, of two sizes,  $\times 600$ .

*Raspaigella dendyi* sp. n.

(Text-fig. 40.)

HOLOTYPE.—B.M. 1936.3.4.354.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion; Stn. 112, January 15, 1933, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

DIAGNOSIS.—Sponge massive, rounded, sometimes with large and small erect digitate processes; surface even, non-hispid; oscules, up to 4 mm. diameter, grouped in one or

more depressions on upper surface ; texture hard ; colour, in spirit, a pale yellowish-brown ; skeleton a loose, scattered reticulation of large and small oxea, with dense, ectosomal feltwork of, mainly, small oxea ; megascleres oxea, of three sizes, 0.9 by 0.048, 0.45 by 0.024, and 0.17 by 0.01 mm. respectively ; microscleres trichodragmata, of two sizes, 0.32 by 0.008 and 0.035–0.07 by 0.014 mm. respectively.

Genus *Pseudaxinyssa* Burton.

*Pseudaxinyssa tenuispiculata* Burton.

*Pseudaxinyssa tenuispiculata* Burton, 1931 : 350, pl. xxiii, fig. 10.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

REMARKS.—A fragment, resembling the holotype in appearance and texture, is assigned with hesitation to this species. Its spicules are oxea, styli and pseudoxea but all are double the size of those originally described.

DISTRIBUTION.—Natal.

Order KERATOSA.

Family DARWINELLIDÆ.

Genus *Darwinella* Müller.

*Darwinella simplex* Topsent.

*Darwinella simplex* Topsent, 1892 : xxvii ; Topsent, 1904 : 55, pl. ix, fig. 3 ; Topsent, 1905 : clxxvi ; Dendy, 1905 : 204, pl. xv, figs. 1–2.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Western Mediterranean ; Azores ; Ceylon ; 200 m.

Family APLY SINIDÆ.

Genus *Aplysina* Nardo.

*Aplysina euplectella* (Hentschel).

*Stelospongia euplectella* Hentschel, 1912 : 442, pl. xv, fig. 5, pl. xvi, fig. 8.

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden (11° 53' 42" N., 51° 13' 12" E.), 73–220 m., bottom coarse sand, shingle and (?) rock.

DISTRIBUTION.—Aru Is.

*Aplysina mollis* Row.

*Aplysina mollis* Row, 1911 : 376, pl. xxxviii, fig. 18 ; Burton, 1926 : 82.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Suez Canal ; Red Sea ; 8 m.

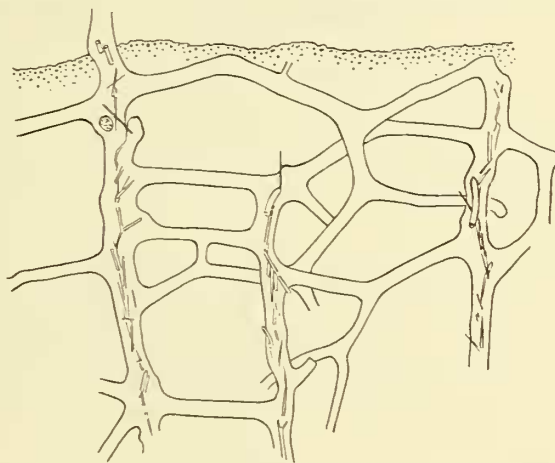
*Aplysina primitiva* sp. n.

(Text-fig. 41.)

HOLOTYPE.—B.M. 1936.3.4.532.

OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), 73–165 m., bottom rock (?).

DIAGNOSIS.—Sponge encrusting; surface conulose, even and smooth between conuli; oscules small, inconspicuous; texture soft; colour, in spirit, light purple; skeleton a

TEXT-FIG. 41.—*Cacospongia symbiotica* sp. n. Section at right angles to surface,  $\times 15$ .

delicate reticulation, with meshes somewhat irregular and confused, more or less oblong and measuring 0.3 by 0.1 mm.; diameter of fibres 0.05 mm.

REMARKS.—Although the structure of the fibres in this species recalls that of the fibres of *Aplysilla*, the fact that the skeleton forms a definite network is justification for regarding it as a species of *Aplysina*.Genus *Aplysinopsis* Lendenfeld.*Aplysinopsis reticulata* Hentschel.*Aplysinopsis reticulata* Hentschel, 1912 : 437, pl. xv, fig. 1, pl. xvi, fig. 9.OCCURRENCE.—Stn. 111, January 14, 1934, Zanzibar Area ( $5^{\circ} 04' 18''$  S.,  $39^{\circ} 14' 12''$  E.), depth unknown.

REMARKS.—The single specimen is small and massive, and has the reticulations of the surface considerably less strongly marked than in the holotype. The skeleton, on the other hand, appears to be typical.

DISTRIBUTION.—Aru Is.; 10–40 m.

Genus *Druinella* Lendenfeld.*Druinella ramosa* Thiele.*Druinella ramosa* Thiele, 1899 : 24, pl. iii, fig. 3, pl. iv, fig. 5.OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Celebes.

Genus *Megalopastas* Dendy.

*Megalopastas retiararia* Dendy.

*Megalopastas retiararia* Dendy, 1921 : 137, pl. iv, fig. 27.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—Okhamandal ; 7 m.

Family SPONGIIDÆ.

Genus *Spongia* Linnaeus.

*Spongia officinalis* Linnaeus.

OCCURRENCE.—Stn. 43, October 28, 1933, South Arabian Coast (17° 29' 00" N., 55° 47' 00" E.), 95 m.

REMARKS.—A small, irregularly massive specimen appears to belong to this species, but is much too small to be assigned to any of the many varieties.

Genus *Spongionella* Bowerbank.

*Spongionella pulvilla* (Dendy).

*Megalopastas pulvillus* Dendy, 1905 : 206, pl. xv, fig. 3.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Gulf of Manaar.

*Spongionella nigra* Dendy.

*Spongionella nigra* Dendy, 1889 : 94 ; *Megalopastas nigra* Dendy, 1905 : 205, pl. xiv, fig. 7, pl. xv, figs. 5-8.

OCCURRENCE.—Stn. 27, October 12, 1933, Gulf of Aden (11° 57' 12" N., 50° 35' 00" E. to 11° 56' 42" N., 50° 39' 12" E.), 37 m., bottom shells and sand ; Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

REMARKS.—The four specimens include two of less than 1 cm. across, irregularly encrusting. The third is some 2 cm. high and irregularly massive, and the fourth is nearly 3 cm. across. In one only is the flesh retained and this is pale yellow in colour. The skeleton in each is closely similar to that of the holotype.

DISTRIBUTION.—Gulf of Manaar.

*Spongionella frondosa* (Hentschel).

*Hippospongia frondosa* Hentschel, 1912 : 435, pl. xvi, fig. 4.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

REMARKS.—The generic position of this species must remain in doubt until such time as a revision of the species, as well as the genera, of Keratosa can be made. It is not a true *Spongia*. Perhaps its closest affinities are with *Spongionella*.

DISTRIBUTION.—Aru Is. ; 10-40 m., bottom coral rock.



Genus *Psammaplysilla* Keller.*Psammaplysilla arabica* Keller.

*Psammaplysilla arabica* Keller, 1889 : 358, pl. xxii, figs. 23-27.

OCCURRENCE.—Stn. M.B. I (d), September 17, 1933, Red Sea (13° 39' 30" N., 42° 43' 00" E.), 26 m., bottom sand, shell and coral.

REMARKS.—A single irregularly massive specimen, 20 mm. high and the same across, coloured purple-brown in spirit.

DISTRIBUTION.—Reefs at Suakin ; 4-10 m., on coral.

Genus *Cacospongia* Schmidt.

*Cacospongia* Schmidt, 1862 : 26 ; *Taonura* Carter, 1882 : 103.

GENOTYPE.—*Cacospongia mollior* Schmidt, 1862 : 27.

DIAGNOSIS.—Keratoso with skeleton a rectangular reticulation of medullated fibres ; without ectosomal skeleton, foreign inclusions, filaments or horny spicules.

*Cacospongia herdmani* (Dendy).

*Aplysina herdmani* Dendy, 1905 : 225, pl. xvi, fig. 4.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—Ceylon.

*Cacospongia symbiotica* sp. n.

(Text-fig. 43.)

HOLOTYPE.—B.M. 1936.3.4.391.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DIAGNOSIS.—Sponge irregularly massive, with numerous bivalves (species not determined) set in body vertically to surface ; surface minutely conulose, and slightly shaggy from projecting ends of main fibres ; oscules small, scattered ; texture compressible, elastic ; pale brown to brownish-purple ; skeleton subscalariform, of ascending fibres, about 1 mm. apart, 0.06-0.12 mm. diameter, cored with broken spicules, and connective fibres, without foreign inclusions, 0.02-0.06 mm. diameter ; without special ectosomal skeleton.

REMARKS.—There are 22 specimens, ranging from 10 to 60 mm. across. The skeleton is typically a regularly scalariform reticulation but this may readily become more irregular, especially in those cases where large sand-grains are included in the tissues.

Genus *Dysidea* Johnston.

*Dysidea fragilis* (Montagu).

(For synonymy see Burton, 1934 : 582.)

OCCURRENCE.—Stn. 24, October 9, 1933, Gulf of Aden ( $11^{\circ} 53' 42''$  N.,  $51^{\circ} 13' 12''$  E.), 73–220 m., bottom coarse sand and shingle ; Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 109, January 13, 1934, Zanzibar Area ( $5^{\circ} 10' 36''$  S.,  $39^{\circ} 33' 48''$  E.), 640 m., bottom light-grey mud.

REMARKS.—The sample from Stn. 109 includes an irregularly massive fragment and two digitate processes 60 by 6 mm., completely macerated. It is similar to that figured by me (l.c., fig. 26). The specimen from Stn. 45 is 10 mm. high by 6 mm. across and 3 mm. thick, a thin erect lamella bearing two incipient digitate processes. The third specimen (Stn. 24) is irregularly ramose, about 25 mm. across, with slender branches averaging 3 mm. diameter. The skeleton of these last two specimens contains sponge spicules only and approximates to that shown in my fig. 31 (l.c.).

*Dysidea cinerea* Keller.

*Dysidea cinera* Keller, 1889 : 337, pl. xx, fig. 2 ; Row, 1911 : 365 ; *Spongelia cinerea* Dendy, 1916 : 140 ;  
*Dysidea cinerea* Burton, 1926 : 82.

OCCURRENCE.—Stn. 112, January 15, 1934, Zanzibar Area ( $5^{\circ} 04' 57''$  S.,  $39^{\circ} 13' 18''$  E.), 113 m., bottom coral rock.

DISTRIBUTION.—Red Sea ; Indian Ocean (Okhamandal Coast) ; 16 m.

Genus *Euryspongia* Row.

*Euryspongia lactea* Row.

*Euryspongia lactea* Row, 1911 : 366, pl. xxxix, fig. 23, pl. xli, figs. 27–28 ; Burton, 1926 : 82.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Suez Canal ; Red Sea.

Genus *Hircinia* Nardo.

*Hircinia arenosa* Lendenfeld.

*Hircinia arenosa* Lendenfeld, 1889 : 583, pl. xxxvi, fig. 3 ; Kirkpatrick, 1903 : 256.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast ( $18^{\circ} 03' 30''$  N.,  $57^{\circ} 02' 30''$  E.), 38 m., bottom Lithothamnion ; Stn. 53, November 2, 1933, South Arabian Coast ( $19^{\circ} 22' 36''$  N.,  $57^{\circ} 53' 00''$  E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

REMARKS.—Of the two specimens from Stn. 45, one is irregular but incipiently cup-shaped, 40 mm. across by 10 mm. high, the other cup-shaped and 170 mm. high, being 180 mm. across the mouth of the cup. Consequently, the first agrees in external form with Kirkpatrick's South African specimens, the second with the holotype, from Australia. A similar series was obtained from Stn. 53. The five smallest, from 30 to 90 mm. high,

are very like Kirkpatrick's smallest specimen, another is of irregular form, incipiently cup-shaped, 40 mm. across and 20 mm. high, and the largest is subglobose with an oscular depression on the upper surface. This last specimen is hollow, with openings connecting the central cavity with the exterior.

The skeleton in all differs from that of the holotype in containing more spicule-fragments than sand.

DISTRIBUTION.—Australia (all coasts); South Africa, 155 m.

*Hircinia aruensis* Hentschel.

*Hircinia aruensis* Hentschel, 1912 : 445, pl. xvi, fig. 6; Burton, 1934 : 580.

OCCURRENCE.—Stn. 53, November 2, 1933, South Arabian Coast (19° 22' 36" N., 57° 53' 00" E.), 13.5 m., bottom rock, shingle, shells and Lithothamnion.

DISTRIBUTION.—Aru Is.; Great Barrier Reef; 12–30 m., bottom coral rock or hard and shelly.

Genus *Carteriospongia* Hyatt.

*Carteriospongia cordifolia* Keller.

*Carteriospongia cordifolia* Keller, 1889 : 352, pl. xxi, fig. 15; *Phyllospongia cordifolia* Row, 1911 : 378.

OCCURRENCE.—Stn. 45, October 29, 1933, South Arabian Coast (18° 03' 30" N., 57° 02' 30" E.), 38 m., bottom Lithothamnion.

DISTRIBUTION.—Red Sea, 9 m.

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